

Royal Commission

on Canada's Economic Prospects

Canadian Secondary Manufacturing Industry

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by D. H. Fullerton and H. A. Hampson

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ROYAL COMMISSION ON CANADA'S ECONOMIC PROSPECTS

**CANADIAN SECONDARY
MANUFACTURING INDUSTRY**

by

D. H. FULLERTON and H. A. HAMPSON


MAY, 1957

*While authorizing the publication of
this study, which has been prepared at
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W. L. GORDON — Chairman

O. LUSSIER A. E. GRAUER A. STEWART R. GUSHUE

D. V. LEPAN — Director of Research



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PREFACE

WE WISH to record our appreciation of the work of members of the Commission's staff, particularly Mr. R. Larocque, Mrs. Hazel McNeil, Miss Nancy Grant, and Mrs. F. Barresi, in abstracting the data relating to secondary industries from the over-all manufacturing figures published by the Dominion Bureau of Statistics. We are also greatly indebted to members of the Bureau and notably to Mr. H. McLeod and Mr. A. Cohen, for their kindness and co-operation in meeting our many requests for special series and unpublished information about secondary manufacturing industries. In this study we have not attempted to reproduce the vast array of statistical data on manufacturing industry generally which is published by the Industry and Merchandising Division of the Bureau. Among the reports and bulletins put out by that Division the reader will probably find the annual *General Review of Manufacturing Industries of Canada* most useful in supplementing the statistical material contained in this study.

It is perhaps unnecessary to state that this survey of secondary manufacturing owes much to the help of a great many people with a more detailed knowledge than we possess of individual secondary industries and of the broad economic problems affecting them. We found particularly useful the industry studies carried out by individuals and organizations for the Commission as well as staff studies on related issues. A list of these studies is contained in Appendix A and references are made to them from time to time in this study.

The first group comprises seven studies of particular secondary industries prepared for the Commission and for which we had some general responsibility. In selecting industries for detailed study of this kind, limitations of time and resources prevented the inclusion of more than a sample of our numerous secondary industries, and the selection was made on the basis of some industry characteristic of special interest. The electrical equipment and electronics industries, for example, were studied because of their dynamic growth record and prospects; the primary textile and industrial machinery industries because of their special problems; the automotive industry because of its importance in the economy and its highly developed techniques of mass production; the agricultural implements industry because it serves the whole North American market; and the primary iron and steel industry because of the very central part it plays in our modern industrial economy. However, just as important as their special characteristics was the fact that each of the industries chosen for study faces conditions more or less common to all secondary manufacturing in Canada. In this respect they may be regarded as typical of secondary manufacturing in this country, and analysis of their individual positions yields a valuable picture of the problems and prospects of the whole secondary industry sector.

Finally, we have drawn freely on briefs submitted to the Commission and on the testimony of many witnesses at the Commission's hearings. Much useful information was also gathered from private conversations with businessmen, industry economists, and others with a special knowledge of manufacturing industry in Canada. We must emphasize, however, that we accept full responsibility for the analysis and the conclusions of the study.

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Part I

**INTRODUCTION, SUMMARY OF GROWTH AND
STATISTICAL BACKGROUND**

INTRODUCTION

THIS SURVEY of Canadian secondary manufacturing industry has three broad aims. First, it attempts to examine the present position and past growth of secondary industry and to show how this is related to the expansion and changing character of the Canadian economy as a whole. Secondly, it sets out to describe and analyze a number of the important factors which influence the costs of secondary industry and consequently its ability to compete with imported goods. Finally, it looks to the prospects for the future, to the prospective total demand for the products of secondary industry, and to the share of this market that is likely to be obtained by Canadian firms.

Secondary manufacturing industry, as defined by us, does not of course cover the whole range of industrial activity included under the Bureau's broad and more commonly-used category of "manufacturing". Excluded from this study are those primary manufacturing operations which involve either relatively minor processing of domestic resources, i.e. in which the value added by manufacture is relatively low, or those highly capital-intensive and often extremely complex industries which produce industrial materials from our basic natural resources for sale mainly in export markets. Flour milling, cheese factories and saw and planing mills are examples of the first type, while pulp and paper production (excluding finished paper goods) and smelting and refining are examples of the second.

In contrast, the secondary manufacturing industries with which this study is concerned are characterized by a rather higher degree of processing and by a much greater dependence on the domestic market. They tend to be located close to the centre of that market, while the primary industries are usually found at or near the resource on which they are based. Secondary industries in 1953 comprised about three-quarters of the output and a slightly higher proportion of employment in manufacturing as defined by the Dominion Bureau of Statistics. Employing over one million Canadians and accounting for more than one-fifth of national output, secondary manufacturing industries generally produce end products rather than industrial

materials. They draw on both foreign and domestic suppliers for raw materials and components and tend to be more labour-intensive than the basic resource industries. Examples of secondary manufacturing are textiles, clothing, transportation equipment and electrical apparatus and supplies. It should be emphasized that the distinction between primary and secondary manufacturing relates to the degree and stage of processing, to the market orientation of sales, and to the source and character of raw materials used, and does not imply that one type of manufacturing is necessarily more desirable, more efficient or more advanced technologically than the other.

This division of manufacturing into two categories naturally involved a few difficult problems of classification which could only be resolved in the last analysis by arbitrarily allocating the industry concerned to one or other of the two groups. Thus food canning and meat packing, two industries which produce final consumer products for the domestic market, are classified as primary manufacturing because they involve relatively minor processing and draw almost exclusively on Canadian agricultural resources. Primary iron and steel production, which is primary in the sense that its finished products are the raw materials of other industries, is regarded as secondary manufacturing because it involves considerable processing, is not specifically based on Canadian natural resources, and was built up to serve the domestic market. Perhaps the most difficult industry to classify was petroleum products, which is to a considerable and growing extent based on Canadian oil and in which the value added to the raw material is comparatively small. However, the industry is also essentially dependent on domestic markets; its plants tend to be located near its main sales outlets; its most important product, gasoline, is a consumer good; and it draws much of its oil from countries other than Canada. It is, therefore, considered a secondary industry. Appendix B sets out a full list of the industries classified as manufacturing by the Dominion Bureau of Statistics and indicates whether they have been placed in the primary or secondary category for purposes of this study.

Despite its obvious shortcomings, this division has proven to be fully justified because it enabled separate study to be given to both primary and secondary manufacturing industry and their differing characteristics and problems. On the one hand, the primary industries, the prospects of which are treated in other studies prepared for the Commission, start out with resource, technical and other competitive advantages and generally have easy access to world markets; with few exceptions they have little or no tariff protection and their prosperity depends primarily on the strength of international demand for their products. On the other hand, the secondary manufacturing industries generally have no pronounced natural cost advantages and frequently are at a positive disadvantage relative to their main competitors; their main sales outlet is the comparatively small and scattered, although rapidly growing, domestic market in which they are confronted with

considerable import competition. Secondary industry, therefore, merits separate study in order to put its present and future role in the economy in proper perspective.

Although the individual studies of secondary industry prepared for the Commission to which we have referred in the preface cover only a portion of secondary manufacturing activity, it was nevertheless possible to close many of the gaps from the various alternative sources of information which were available to us. Yet it obviously was not practical or possible for a staff study of this kind to attempt to produce either a comprehensive analysis of every secondary industry or a market forecast for each product manufactured in Canada, and we have not tried to make this survey a substitute for more detailed industry and product studies by Canadian businessmen, economists and scholars. In fact, surprisingly little work has been done in this field in Canada in the past and there appears to be considerable scope for profitable and valuable research along these lines in the future. In the circumstances our approach throughout will be to try to establish broad general conclusions which apply to secondary manufacturing as a whole rather than to present a mass of detailed information on an industry by industry basis. We have accordingly confined ourselves to outlining the main factors which affect the competitive position of Canada's main secondary industries and to giving some broad estimates of their prospects, both individually and as a group. It should be noted that the industries in the secondary manufacturing group operate under extremely varied conditions and range from comparatively simple assembling and processing to complex and highly integrated mass-production operations. While therefore generalizations can seldom be made about secondary industry as a whole without appropriate qualifications, an underlying pattern of similarity can nevertheless be clearly discerned. It is on this pattern that we focus our attention, in the hope that we may make some contribution to a better understanding of this important sector of the Canadian economy.

We must, of course, emphasize that this is a descriptive and analytical study in which our role is not to make policy recommendations. Indeed for forecasting purposes we assume no net change in policies affecting the secondary industry sector. Nevertheless the question of how much secondary industry is desirable in this country and whether government policies should be used to alter its rate of growth is a subject of considerable controversy. We show in later chapters that a significant portion of Canadian secondary industry is relatively high-cost and requires some tariff protection to maintain its present level of output. This protection normally has costs for the economy and affects the real incomes and standard of living of Canadians. In times of full employment the additional resources drawn into domestic manufacturing can generally only be obtained from alternative occupations whose real productivity is higher. However, to the extent that secondary in-

dustry provides the only alternative employment for low-productivity labour that would otherwise be immobilized in marginal occupations, this conclusion would not apply. Because the question of the desirability of secondary industry cannot be answered with certainty or fairness by considering only immediate economic costs we believe it necessary at this point to review a few of the other and less directly economic arguments involved. This is done in succeeding paragraphs but no attempt is made to go into detail or to draw any conclusions, in view of the fact that these matters are more appropriately dealt with in other publications of the Commission.

It should be noted that as a practical matter most people would not at the present time be willing to undergo the adjustments and dislocations involved in any serious change in policies which attempted to alter the fundamental nature of the Canadian economy. The basic framework of Canadian industrial development is set largely by trends in world demand and by our resources and geography; in these circumstances government policies can only affect the structure of the economy to a comparatively modest degree without becoming entirely unacceptable to the great majority of Canadians. The choice is, therefore, not between black and white, an enormously expanded secondary industry or none, but instead between rather more or rather less. Over the long run, of course, gradual changes in one direction or the other should not be entirely ruled out as a practical possibility.

The most commonly heard reason for inducing more secondary industry is that it is better able to provide jobs per unit of output than most other types of activity and hence enables us to sustain a larger population. However that may be, it is quite clear that the job-creating argument can only be considered when the long-run outlook is for chronic labour surplus; it makes little sense to attempt to create additional jobs if labour shortages and inflationary pressures are expected. In any event there is sharp disagreement among economists about the validity of the job-creating and population-sustaining argument. Some argue that as a consequence of inducing high-cost industries, total output, incomes and standards of living would fall appreciably relative to the United States and would consequently tend to stimulate emigration to that country. Others hold that the impact on standards of living would not be great and point out that there is already a considerable gap between incomes in the two countries, apparently without affecting our recent growth. These economists tend to doubt that fiscal and monetary policy alone will maintain full employment in a growing economy, while the other group counter this argument by pointing to the record of growth in the postwar period.

One of the arguments used by those in favour of stimulating secondary industry is that an economy which is too dependent on primary industries is not amenable to full employment policies because its prosperity rises and falls with foreign demand. This is essentially the same as the contention that the

primary industries are more volatile and more exposed to fluctuations in foreign economic activity than secondary industry which, although higher-cost, offers better balance in the long run against depressions emanating from outside Canada. No definite conclusion on this issue is possible although three main facts emerge from a study of the past: first, that United States economic fluctuations usually originate in, and most significantly affect, the capital goods and consumer durables industries of the secondary manufacturing sector; second, that in Canada, secondary industry as a whole has been as hard hit as other sectors of the economy in depressions; and thirdly, that the behaviour of individual secondary industries has varied widely. It should be emphasized first that increased understanding of economic forces makes the recurrence of a major depression less likely. But even if one should occur there is no clear indication of what the relative severity of fluctuations in different sectors of the economy might be in the future, in view of the fact that no serious attempts were made by governments in the past to adopt full employment policies in periods of depression. It is a matter of dispute in these altered circumstances whether an expanded secondary industry could be insulated from external and internal disturbances, and if so, whether the benefits would be important enough to outweigh the cost.

Too great a dependence on primary manufacturing and the resource industries is also seen by some people as objectionable on the grounds that minerals, if not power and forest resources, are of necessity wasting assets which will be exhausted at some time in the future. Nevertheless it appears that new metal and oil discoveries are closely related to current production—the incentive to develop new reserves increases as output rises and new markets are found. However, we are not competent to assess the prospects of discovering adequate mineral reserves in the future.

There is, in addition, a strong feeling that secondary manufacturing is desirable in itself, a question which we do not attempt to assess. This question is, however, in part linked to the more concrete argument that Canadians want to live in cities and that urban growth is associated with secondary manufacturing. There is no gain-saying the validity of this argument as the expansion of Hamilton, Windsor, Oshawa and other centres attests. Yet the Commission's study on housing and social capital draws attention to the fact that urbanization antedates the factory by many centuries, while in Canada the rise of the large metropolitan areas of Montreal, Toronto, Winnipeg, Edmonton, Calgary and Vancouver has also been associated with great surges of primary and resource industry growth. In this connection that study says, "The fact would seem to be that under conditions of modern technology even the hewing of wood and drawing of water is increasingly a matter for townsmen; or rather that the active hewers and drawers, who themselves more often live in towns, increasingly tend to be outnumbered by urban echelons to the rear—the administrators, financiers, suppliers,

shippers and providers of ancillary and personal services". We point out in the following chapter that secondary industry growth has also achieved its greatest peaks when the economy as a whole has been growing most rapidly. Rather than linking the growth of cities exclusively to the expansion of one sector then, it seems more accurate to say that urbanization is tied to the expansion of the economy as a whole, an expansion in which secondary industry plays a very important part.

It is also reasoned that an artificially increased secondary industry will be needed to maintain Canada's independent existence and that an expansion of trade in its east-west mold is necessary to cement the country's national unity. Many people hold that Canadian national consciousness will be weakened unless north-south trade is reduced. Others hold the contrary view that close trade, personal and travel ties make Canadians more aware of their own unique characteristics and culture. It is generally agreed that east-west trade provides many economic links between the centre and the extremities of this country, despite the feeling in some regions that its costs are out of proportion to its benefits. But how much of this trade is necessary to preserve national unity is a question that we cannot pretend to answer.

Defence requirements and strategic considerations provide another non-economic argument for expanding secondary industry. The need to make the fullest use of the defence budget by purchasing from the cheapest supplier is sometimes in conflict with the need to have an assured source of supply. The importance of supply considerations will in turn be affected by the extent to which our defence production is integrated with that of other countries, by the arrangements made for mutual supply in time of emergency, and by the type of war foreseen. If thermo-nuclear weapons are used in any general war in the future it will probably be necessary to fight with the forces and equipment available at the outbreak of hostilities. This would indicate that the forces in being must be kept supplied with the most up-to-date equipment possible in peacetime, in contrast to earlier experience when the object was to have a standby industrial defence base which could be expanded after the outbreak of hostilities. What the effect of this change may be on the importance of domestic sources of supply will depend in large measure on mutual supply arrangements made with the United States.

A further argument for stimulating secondary industry is the contention that, although additional secondary industry might have substantial economic costs in the short run, it would pay for itself in the long run through external economies such as the creation of a cadre of entrepreneurs, administrators and technicians. Such policies may well act as a catalyst to economic growth in underdeveloped countries like the Canada of 75 years ago, but there is considerable division of opinion on the need for such policies in an economy as advanced as that of Canada today. Insofar as there is scope for improving the technical training of certain scattered low productivity groups in the economy

or of labour displaced by the march of economic progress, many people would favour the direct remedy of an increase in vocational assistance rather than the creation of secondary industry.

Finally, it is frequently suggested that secondary industry requires special stimulation because the economy is not flexible enough to find alternative occupations for those resources unable to adapt to growth and changing circumstances. Those who hold the contrary view believe that the economy is on the whole fairly pliable and allocates resources in the most effective way in response to the dictates of the market and to the judgments of businessmen and individuals. They do, however, make the extremely important proviso that full employment policies be adhered to by governments. They point to the smooth postwar reconversion, the extensive migration of people within Canada to the faster-growing high-income regions, and the substantial movements out of marginal agriculture, fishing, and coal-mining. Those on the other side tend to take a less optimistic view about the rigidities of the economy; they stress the fact that movements out of the marginal activities have been comparatively slow and far from complete, and emphasize the monetary and social factors which make for immobility and impede the free flow of the factors of production. As with all arguments, there is a substantial element of truth on both sides; it is not unrealistic to believe that the economy is on the whole fairly flexible while at the same time admitting there are regions in which some special action may be necessary to deal with rigidities.

Our experience during the last 15 to 20 years tends to support this composite view. Our rate of growth in population and output has considerably outdistanced that of the United States, yet there would be few who would not admit that some industries and the areas dependent upon them have not fully shared in this growth and have encountered more or less intractable problems. It is not likely to be otherwise in a dynamic economy. The very nature of growth is that it is uneven, introducing new products, evolving new processes, and bringing about increases in real wages. The over-all effect of this kind of growth is to bring about a relative or absolute decline in some industries. The price of progress must apparently be paid in the sloughing off of some industries and segments of industries, for as explained in succeeding chapters, all are not equally able to compete for scarce resources of manpower and capital. To say that national progress and prosperity cannot be judged from the fortunes or point of view of a particular industry, whether in manufacturing or other sectors, is not however to deny that problems exist for those who find themselves unable to adapt to changing circumstances.

Although we have reviewed some of the arguments for further stimulating the present rate of growth of secondary industry, we have not attempted to draw any conclusions about their validity or relative importance. Nor have we attempted to establish whether alternative policies would be more appro-

priate than an increase in secondary manufacturing. The question of what price should be paid for any non-economic benefits desired has also been left unanswered. Indeed, it would be presumptuous on our part to try to weigh all those intangibles; rather, it has been our aim to draw attention to their existence in order that the economic data presented in succeeding chapters may be viewed in a somewhat broader perspective.

THE BACKGROUND OF GROWTH

IN THIS brief glance at the past it is, of course, impossible to present a detailed historical analysis of Canada's secondary industry and of the individual industries of which it is comprised. Our task has not been made any easier by the fact that comparatively few studies have been made of Canada's economic history, particularly as it relates to secondary manufacturing. The aim of this chapter is, therefore, limited to sketching the main forces which have influenced the growth of domestic manufacturing with special emphasis on the period since 1939. We leave the principle factors affecting its competitive position for analysis in succeeding chapters. In looking back briefly at the early developments of secondary industry in this country it is necessary for the most part to think in terms of manufacturing as a whole, both because the statistical data for the period are uncertain and because the difference between primary and secondary production is blurred by the more elementary processing and assembling operations of those days. Such statistical data as are available for the different periods since Confederation will be found in the statistical appendix at the end of this study.

At the time of Confederation Canada had a scattered population of some 3½ million people with a Gross National Product that has been estimated by Dr. O. J. Firestone at less than \$200 per capita in terms of 1935-39 dollars. Most of the country's trade was based on the products of the farmer, fisherman and lumberjack in which occupations over 50% of the population was employed. Manufacturing was on the whole a local occupation of a semi-handicraft nature employing very little capital and producing such basic consumer goods as woollens, boots and shoes and alcoholic beverages, processing raw materials such as tobacco, flour, and lumber, or making certain capital goods in which Canadians had acquired special skills as, for example, shipbuilding and agricultural implements. Technology, machinery and labour skills were generally imported but because of low wages and cheap materials many manufacturers were able to sell in the United States market, especially in the inflationary Civil War period. The less efficient were sheltered by the

isolation and self-sufficiency that resulted from lack of transportation and communication facilities. Benefiting from the incidental protection of the Galt-Cayley tariff, manufacturing by 1871 employed about one-eighth of the labour force.

It was only in the succeeding period from 1871 to 1896 that the second industrial revolution of steel and railroads, its advance influence already being felt, had its full impact on Canadian manufacturing. More advanced technology, corporate organization, and low-cost transport (freight rates fell by nearly 50%) combined to foster a unified market and a factory-based system of specialized mass production to serve it. This period may be said to embody in many ways the main features which continue to characterize North American progress down to the present day: expanding output based on technological advances, strong competition, and a continually increasing use of machinery and mass production techniques to reduce dependence on expensive labour. Dr. Firestone estimates that the constant dollar value of fixed capital per person working in manufacturing almost tripled from 1870 to 1900 while net value of production rose more than 3½ times to \$360 million. Employment increased from 140,000 to 310,000 and significant gains were made in real output per man. This progress appears hard to reconcile with what has been recorded by many as a period of depression and lagging economic activity. Some of this apparent gain may be due to the fact that later census coverage was more complete than earlier compilations, but there does not appear to be any reason to believe that statistical inadequacy completely distorts the picture given here. Real Gross National Product per capita is estimated to have risen by some 75% between 1870 and 1900, and population grew by one-third. Export prices were below their 1873 level in only six years between 1873 and 1896¹ and their value increased by more than 40% in this period. It appears that sharply falling domestic prices, traders' inventory losses and the painful readjustments which accompanied the introduction of new production methods have sometimes over-shadowed the very real gains made by the economy and by manufacturing prior to 1900.

Canada's progress was slow, however, compared to that of the United States, in part because of the lag in the development of Canadian entrepreneurial and management skills. In this period the United States, endowed with the markets, the people and the skills necessary for the successful adaptation of the new industrial techniques, became the world's leading manufacturer and achieved gains in real output and productivity since unequalled. On the one hand this led to more attractive opportunities and incomes in the United States and induced an estimated 1½ million people to emigrate from Canada, while on the other it led to a sharp increase in the competitive power of American producers in the Canadian market as the prices of manufactures fell faster than those of many of Canada's unmanu-

factured exports. While the real incomes of Canadians generally benefited from this gain in the terms of trade, domestic manufacturers, because of the imposition of fairly high United States tariffs at this time, had no real mass market in which to sell in order to keep unit costs down. The American tariff may not greatly have affected the growth of United States manufacturing for which the natural growth of the domestic market made economic and technical conditions favourable. However, it clearly impaired the cost position, and consequently the competitive ability, of Canadian producers in both domestic and foreign markets. Together with the Canadian tariff, this factor has led to the existence of a relatively diversified Canadian secondary industry largely confined to the small domestic market.

The national policy tariff developed in Canada after 1879, while by no means as striking a contrast with the policy of the earlier period as is sometimes believed, caused the ratio of duty collected on dutiable imports to rise from 21.4% in 1878 to 31.0% in 1896. This decision to increase protection to domestic producers in spite of the higher costs entailed, doubtless was responsible to some extent for permitting the new manufacturing techniques to establish and expand in the face of strong foreign competition and limited domestic markets, although it is not clear how much of the increased tariff represented higher protection and how much represented increased revenues on non-competing imports such as sugar, tea, and coffee. However, it is interesting to note that the existence of the new tariff was widely credited for the pick-up of economic activity from 1879 to 1883 and just as widely blamed for the slow-down from 1884 to 1887 and for the failure to secure concessions which would permit access to the American market. Nevertheless the basic structure of the tariff was set in this period: the multiplicity of rates applying to different countries, the end-use items, the drawbacks for home consumption or export, and the concessions for goods or materials of a kind not available in Canada. The aim, of course, was to achieve a workable compromise which minimized the direct impact of the tariff on those export and agricultural interests which had to meet world prices, and at the same time maximized protection to domestic producers. It should also be noted that one of the incidental effects of the higher tariff was to stimulate the growth of United States branch plants in Canada. Nevertheless it would be wrong to claim that the bulk of Canadian manufacturing by the end of the last century was made up of anything more than comparatively simple processing. Only 14,000 of the 76,000 establishments employed five hands or more, and despite bounties and protection such activities as steel making had made little progress. However, between 1870 and 1900 food processing industries doubled in size, the wood using industries more than doubled, textiles nearly tripled, and the annual production of farm implements reached well over \$8 million. A beginning was also made on such new industries as pulp and paper, railway rolling stock and chemicals.

The boom of 1896 to 1913 was a period of solid prosperity combined with rising prices. The revival of world economic activity created a strong demand for food stuffs and raw materials which led to the settlement of the Canadian west, the wheat boom, and an age of railway building. A relatively less important but still significant stimulus was given to the economy by the development of the new resource industries such as hydro-electric power, metal mining and forest products. Exports rose in value from \$110 million in 1896 to \$432 million in the year ended March 31, 1914, or in volume terms by 200%. The derived rise in incomes stimulated natural population growth and immigration, and the population grew by over 2 million people. Real national output is estimated to have increased by some 75% in the decade ending in 1910 and total new capital investment undertaken in the period as a whole is estimated at \$4.5 to \$5 billion. These expansionary forces created the conditions for a solid growth of manufacturing despite modest reductions in tariff protection (the ratio of duty collected on dutiable imports fell from 31% to 26%) and the gross value of manufacturing production nearly tripled from 1900 to 1910 while employment rose by half to 515,000. In real terms the gain in manufacturing output was over 90%, or greater than for the economy as a whole.

Rising incomes and population led to an expanded net value of production for the consumer goods industries such as textiles, tobacco and boots and shoes. As was to be expected, those industries processing goods for the expanding export market did somewhat better, for example flour milling, pulp and paper, non-ferrous metal smelting, liquor and heavy chemicals. More significant for secondary industry was the fact that the growth of the domestic market and the large volume of investment generated by the railway and export boom created favourable conditions for the very rapid development of the capital goods industries. Production of steel rose from 30,000 tons in 1896 to nearly 1.2 million tons in 1913, while railway rolling stock expanded its net value of production five times and electrical apparatus and supplies increased its output sevenfold (the amount of installed hydro-power grew from 175,000 h.p. in 1900 to nearly 2 million h.p. in 1914). The further development of specialized production and distribution processes and the growth of capital requirements was accompanied by the merger and combination of many smaller firms into large corporate units. It was also accompanied by large inflows of capital, and by the establishment of over 200 branch plants of United States manufacturing enterprises. Despite the many new manufacturing activities and skills acquired by Canada prior to 1914 and despite the illusions of self-sufficiency to which prosperity and growth contributed, most luxury consumer goods and many machinery and equipment items continued to be imported. However, this period does serve to underline the importance of a growing domestic market in fostering the development of new secondary industries and in improving the competitive position of established firms. More economic production runs were permitted,

new management and technical skills were acquired, and capital was accumulated, all of which built up a firmer base for future expansion.

Although Canada had avoided the recessions of 1904 and 1911, manufacturing activity turned downward and unemployment rose after 1913 as the investment boom showed signs of ending; steel production, for example, fell nearly one-third to 829,000 tons. However, the outbreak of war, the cutting off of traditional import sources of capital goods and the high cost of overseas shipping combined to protect manufacturing from foreign competition and to boost employment after 1915, particularly in the iron and steel industries. High prices for non-ferrous metals stimulated mining and refining, pulp and paper exports rose and flour milling increased in importance as food exports to overseas countries trebled. More than \$1.5 billion of war materials was produced from 1915 to 1918, mostly in the form of shells and explosives, although some ships and aircraft were manufactured as well. However, the stimulus which the war gave to the Canadian economy and to manufacturing has been somewhat exaggerated. Employment in manufacturing rose by one-third from the poor employment year of 1915 to the peak year of 1917, but the gain measured from 1910 was only 17½%. Similarly, the gross value of production nearly trebled from \$1.2 billion in 1910 to \$3.2 billion in 1918 but when adjustment is made for the sharp price inflation, the real increase becomes a more modest 30% (20% if measured from 1913). Nevertheless this was greater than an estimated increase of only 10% of real national product so that manufacturing did increase its importance to the economy during the war. A large part of the expansion in physical output was made possible by the existence of unused capacity, particularly in the primary iron and steel industry where production rose from 829,000 tons to 1,874,000 tons between 1915 and 1918, while capacity expanded by only 400,000 tons. Likewise, the technical, management and other skills acquired were probably fairly modest in view of the comparatively simple nature of shell making. In summary, some manufacturing industries like iron and steel, explosives and pulp and paper did expand output substantially in the First World War but the gains in manufacturing as a whole were not as significant.

Following the sharp but short postwar recession in 1920-21, the Canadian economy moved steadily ahead until 1929. Strong world demand for foodstuffs, paper products and minerals caused exports to rise 50% in value and to double in volume from 1921; in turn this led to high and sustained levels of investment, over one-third of which was centred in the primary and resource industries like hydro-electric power, pulp and paper and non-ferrous metal smelting, all of which more than doubled their real output in this period. Carried upward by these forces, real national output between 1921 and 1929 is estimated to have risen by 75% (50% from the peak year of 1920), while real income per capita rose by more than one-third. Despite a

slight decline in tariff protection, these high levels of employment and income led to an even faster rise in the output of manufacturing in physical terms, nearly 100% from 1921 and 75% from 1920. Employment rose by one-half between 1921 and 1929, about the same as for the whole economy, although measured from 1920 the gain was only 10%. Much of the increase took place in the secondary sector where by 1929 some three-quarters of the manufacturing labour force was employed.

It should be noted here that there are two ways of measuring employment in secondary manufacturing. The first is derived from over-all labour force data which measure employment in the economy as a whole and in its broad sectors. The other is taken from the census of industry series which is based on somewhat different measurement techniques and coverage and which is the only series available for the years prior to 1926. Each series is extremely useful for different purposes, the former for comparison between sectors, the latter for industry comparisons within secondary manufacturing itself. As shown in Table 7 there is a discrepancy between the two series which in some years amounted to over 15%. In 1929, the census series shows employment in secondary industry at around 500,000 while the labour force data show the total as some 591,000. However, in recent years the differential between the two series has narrowed to about 5%. Where total employment figures for the secondary industry sector are given in this study they refer to labour force data unless otherwise specified.

Similarly, several measures of output are available, including value of production, indices of industrial production and Gross Domestic Product, the latter a concept which is employed throughout the Commission's work. In order to achieve consistency with other studies, to obtain the best measure of net output, and to avoid distortions due to price changes, we have used this last measure where possible. Gross Domestic Product is essentially the same as Gross National Product at factor cost in that it excludes indirect taxes minus subsidies. It differs from the latter, however, in that an adjustment is made to exclude incomes received from non-residents and to include incomes paid to non-residents. Those interested in the method of construction of Gross Domestic Product indicators and in their technical limitations are referred to the Commission's study *Output, Labour and Capital in the Canadian Economy*. It is enough to note here, however, that Gross Domestic Product measures net output produced in Canada, and includes wages and salary income, profits, and returns to other factors of production as well as depreciation allowances for capital consumed. Tables measuring Gross Domestic Product by sector and by industry will be found in the statistical appendix; in cases where this measure is not available we have used other concepts—in the earlier period deflated value of production and in later years indices of industrial production.

A number of secondary industries made rapid progress in the decade of the '20's, particularly those producing consumer durables, electrical machinery and capital equipment. Thus production of motor vehicles rose from 94,000 to more than 262,000, electrical equipment more than doubled its output and industrial machinery production rose by nearly three-quarters. Due to American industrial leadership in these fields, there was a sharp upswing in the number of branch plants established in Canada in this period. At the same time, consumer products such as textiles, clothing and processed foods moved ahead at a rate not far different from the economy as a whole, the exception being alcoholic beverages, sales of which, doubtless stimulated by United States prohibition, more than trebled. However, output in the primary iron and steel industry exceeded the 1920 level of 1.2 million tons only in 1928 and 1929 and even the 1.5 million tons produced in the latter year fell far short of the record output in 1918. The main reason seems to have been the inability or unwillingness of the steel companies to shift their output from such basic products as steel rails to the newer types of steel required by the automobile, other consumer durables, and construction industries.

The progress of secondary industry, like all other sectors of the economy, suffered a very sharp setback in the great depression of the '30's. The world-wide disruption of trade and employment caused Canadian exports to fall by one-half in value and by one-quarter in volume; fixed investment dropped by about 80% in real terms and national output was about 30% lower. Employment data for this period are far from satisfactory, especially because there was considerable concealed unemployment, particularly in the agricultural sector. The Commission's estimates indicate that total employment fell by about 12%; however if the farm sector is excluded the decline amounts to some 15%, to which must be added some allowance for under-employment in other non-agricultural sectors. This drastic fall in Canadian incomes and employment naturally affected the main domestic markets of secondary manufacturing, particularly those of the capital goods and consumer durables industries. It appears that real output in this sector fell by over one-third, while net investment also declined relatively sharply and employment fell by 25% or 150,000 persons. Secondary industry output, investment, and employment were more severely affected than the economy as a whole although the percentage falls in primary manufacturing employment and construction output were considerably larger. It should also be noted that prices and incomes in the export and farm sectors generally fell more sharply than those in secondary manufacturing. The Rowell-Sirois Commission estimated that the price of tariff-protected commodities fell by 14% compared to a decline of one-half in farm prices and 40% in export prices, the latter, of course, being to some extent influenced by farm prices. In short, adjustments in domestic manufacturing generally took the form of sharp declines in output and employment as contrasted to the marked falls

in prices and wages which constituted the main form of adjustment in some of the other commodity producing industries.

Those individual secondary industries providing consumer soft goods, such as clothing, boots and shoes, food and tobacco, purchases of which are not easily deferrable, suffered declines in output of 15% to 20%, compared to much sharper falls in the more volatile capital goods, luxury or consumer durables industries. Steel and automobile production fell to less than 20% of capacity in 1932, production of agricultural implements and industrial machinery fell by two-thirds and output of electrical apparatus and supplies by over half, with decreases in value being in all cases very much greater. Tariff levels were sharply raised in this period and administrative restrictions and arbitrary valuations were used to raise real protection to very high levels, particularly in the case of textiles, clothing, automobiles and electrical apparatus. For example, on woven cotton fabrics the ad valorem rate applicable to United States imports was raised from 22½% to about 45%, while on some farm implements duties increased from 7½% to 25%; in the case of primary textiles this added protection, the availability of ample labour supplies, and a surprisingly well-sustained home demand enabled physical production to surpass its 1929 level by 1933, after a fall of 15% to 1932. Production of agricultural implements remained extremely low in view of the severe depression in farming which resulted in a weak domestic and export market for these goods. Added protection for secondary industry diverted an increased share of the existing Canadian market to the domestic producer, reducing unemployment somewhat at the expense of the foreigner, but the fall in the total market nevertheless overwhelmed any rise in the Canadian share in most cases.

Although population continued to grow, the economy recovered only slowly and it was 1939 before real national output surpassed its 1929 peak; in physical terms, fixed investment was still well below pre-depression levels but exports and consumer expenditures were slightly above. In effect, a whole decade of potential growth had been wasted. Secondary manufacturing production recovered at about the same pace as the economy, although its share of employment decreased somewhat due to its above average rate of productivity increase. Mainly as a result of reciprocal trade agreements with the United States in 1935 and 1938, over-all tariff protection by 1939 had declined to approximately the same levels as a decade earlier although the treatment of individual industries varied widely. Nonetheless the increase in protection and in margins of imperial preference which took place in the early 1930's was the main factor in encouraging the establishment of more foreign-owned branch plants during the period; cutting the other way were increases in United States tariffs which reduced the incentive to process primary products in Canada.

Consumer soft goods industries showed the greatest general improvement in the secondary sector from 1933 to 1939; for example, output of miscellaneous foods and bakery products increased by 15%, clothing by nearly 20% and boots and shoes by 12%. In contrast, reflecting the failure of investment to recover, and the prolonged period of low incomes, most of the capital goods and consumer durable industries, while above their depression lows, had not equalled 1929 output by 1939; shipbuilding was down by nearly one-quarter, industrial machinery by more than one-third and motor vehicles and parts by 15%. However, chemicals and petroleum products both increased their physical output by nearly one-third in the decade as technological change and growth in relative demand combined to give them a sharply increased market. Primary textile output also increased by about one-third, of which 10% stemmed from increased consumption and the balance from an increased share of the market served by domestic mills. As noted above, this record high share apparently was mainly due to very high *ad valorem* and administrative protection against imports. Despite these exceptions, there was still substantial unused capacity in secondary manufacturing and in the economy as a whole when war broke out in 1939.

The all-pervading demands of modern war caused the Canadian economy to undergo a dynamic surge of growth which reached its peak in 1944. Gross Domestic Product rose by two-thirds, employment (including armed forces) expanded by more than a quarter, and unemployment disappeared. In secondary manufacturing, however, growth was even more impressive; physical production increased by 160% to account for more than a quarter of national output and employment nearly doubled, amounting to about a quarter of the total civilian labour force. This extremely rapid expansion was brought about primarily by the need to produce munitions and highly complex war supplies for the use of ourselves and our allies. This stimulus was strengthened by the fact that cost and competitive considerations were of secondary importance in wartime. Indeed, there was frequently no alternative source of supply. Additional factors contributing to the increase in secondary industry production were the demands of a full employment economy (despite the existence of comprehensive governmental controls) and the special incentives to industrial expansion offered by various government measures.

On the supply side, this growth of output of secondary manufacturing was partially made possible (perhaps to the extent of one-third) by the existence of the unemployment and unused capacity noted above; further industry examples of this underemployment were steel, agricultural implements, and automobiles, which in 1939 operated respectively at about 70%, 50% and 55% of capacity. Also, some of the wartime growth may have been illusory; the statistics tended to inflate the expansion in real output due to the difficulty of valuing munitions on a basis comparable to civilian pro-

duction. Similarly, the growth of secondary industry, as contrasted to other sectors, may have been overstated by the rather arbitrary classification of most war production as secondary manufacturing. Nevertheless the major part of wartime increases in this sector represented real growth which involved significant additions to the stock of plant and equipment² and to the less tangible but nevertheless equally valuable factors of management, labour, and engineering and technical skills. Perhaps most important, it contributed to a substantial strengthening of Canadian business confidence.

From 1939-45 Canadian secondary industry produced nearly \$10 billion of munitions and war equipment, including one billion pounds of explosives, nearly 900,000 military vehicles, 4,000 naval ships and 400 ocean-going merchant vessels, 16,000 aircraft, and over 16 million tons of steel. New industries were created, new products were manufactured, and new and more integrated production processes were used; examples of these trends towards increased diversity and complexity were the production of synthetic rubber, nylon filament yarn, roller bearings, antibiotics, high-octane gasoline and aircraft. The industries producing military hard goods naturally showed the greatest expansion, more than tripling their output from 1939-44. Output of transportation equipment rose nearly seven times due principally to a 3500% increase in aircraft production and a 2000% increase in the long-dormant shipbuilding and repairing industry; peak employment in the two industries reached 80,000 and 75,000 respectively. The iron and steel group of industries expanded to 3½ times their prewar size, with steel production rising from 1.5 to 3 million tons, and the electrical industry tripled, with electronic production rising nearly ten times. Mainly reflecting the increased output of ammunition and explosives, secondary chemicals grew to nearly four times its 1939 size. The industries normally producing consumer soft goods also expanded to meet the needs of our armed forces and allies as well as to serve the increased demands of the civilian population. However, growth in these industries was considerably slower than in the durables sector.

The build-up of war production brought the economy and secondary industry to their peaks of growth in mid-1944. It was, however, only in early 1945 that the whole economy began to swing back towards peacetime production. This period of immediate reconversion was over by 1946, although all of the economic adjustments made necessary by the war cannot be said to have worked themselves out until some years later. But between 1944 and 1946 the economy had to adjust to a fall (in 1935-39 dollars) of \$2.5 billion in government expenditures and of \$500 million in exports due to the sudden drop in Canadian and allied requirements for military goods and other wartime necessities; these declines were partly offset by a fall in imports. That the change occurred swiftly and smoothly was due primarily to

²Wartime investment in secondary manufacturing was financed to a considerable extent by the federal government's defence expenditures. Consequently, a part of the increase in the physical assets of this sector was not reflected in published investment data for this period.

a 25% rise in consumer expenditures; this war-deferred demand was stimulated by the public's accumulation of liquid assets and by grants and loans to returning veterans. Investment, postponed by many years of depression and war, also increased as did government-financed overseas exports of non-defence goods. On the supply side, many war-workers retired from the labour force so that unemployment averaged less than 3% in 1946; numerous veterans took advantage of government aid to attend universities; and much wartime production was easily converted to civilian purposes. In the event, Gross National Product fell by only 7% in constant dollars and the total per working person, including the armed forces, showed practically no change.

Secondary industry, in which most war production had been concentrated, felt the burden of reconversion more severely than the economy generally. From 1944 to 1946 output in this sector fell from \$4 billion to \$2.8 billion, or 30%, its share of total output declined from 24.5% to 20.8%, and its employment fell from 1.1 million to 950,000, or about 14%. Some of the apparent fall was doubtless due to the statistical illusion referred to above and to the abandonment of extra production shifts, but the problem of reconversion was nevertheless a large one. However, more than half the plants devoted to war production were found to be fairly easily convertible to civilian use (textile factories producing cloth for military uniforms, automobile producers turning out military vehicles, etc.). A further 40% of establishments were convertible after fairly extensive adaptation and only a comparatively few plants, mainly temporary explosive factories in remote locations, had to be entirely abandoned. Not included in these totals are the large segments of secondary manufacturing in which wartime and civilian production did not differ markedly (tobacco, beer, many types of primary steel, etc.) and which cannot be said to have had any reconversion problem. In general, secondary manufacturing had improved its financial position as a result of capacity operations during the war years. The physical assets of many industries such as primary iron and steel had been enhanced by essential wartime investment on which generous write-offs had been allowed and by the acquisition of government-owned plants at depreciated prices. Together with high levels of consumer demand and business confidence, these factors contributed to the easing of the transition process. In fact, therefore, the immense task of reconversion in the secondary industry sector was accomplished comparatively quickly and relatively painlessly.

Individual secondary industries were naturally affected very differently by this process. The industries producing non-durable consumer goods, particularly those in which output had been restricted during the war, usually found the change-over easiest and civilian demand relatively greatest. Thus from 1944 to 1946 output of the secondary food industries, tobacco, textiles and clothing showed little change although the latter two were slightly below their 1942 peaks; however, distilled liquors and beer in-

creased by 50% and 30% respectively. Printing and publishing and secondary paper products, also of low priority in the war years, increased by approximately one-quarter. Secondary chemicals production, however, was less than half its 1944 level because a fall of nearly 95% in the production of explosives and ammunition more than offset increases in consumer chemicals such as medicinal preparations, soaps and paints. The secondary industries producing durable goods found the physical problems of reconverting to peacetime production more difficult and civilian markets for a number of their products small in relation to their war-expanded capacity. For example, output of steel ingots fell from 3 million to 2.3 million tons in this period, other iron and steel and non-ferrous metal products by one-third, the motor vehicle industry by nearly half, aircraft and shipbuilding production by 85% and 75% respectively, electrical apparatus and supplies by one-fifth, and electronics by nearly three-quarters. The furniture and building products industries were the principal exceptions, increasing their output moderately. However, both had expanded by comparatively small amounts during the war and found it easy to gear their production to increased consumer and investment demand.

The impact of adjustment on secondary manufacturing, particularly the durables industries, can also be judged by the fact that production of the latter group of industries and of the whole sector did not surpass their 1944 peaks until 1956. Much the same pattern was followed in the United States where secondary manufacturing did not equal 1944 production levels until 1953 and did not out-distance them until late 1955. The reasons for this are obvious. First, as noted above, the statistics of wartime output in both countries appear to be considerably over-inflated. Second, wartime markets for a few products such as aircraft, ships, explosives and armaments were immensely greater than any conceivable level of civilian demand—no possible peacetime use could be found in Canada each year for the equivalent of 4,000 military aircraft and billions of rounds of small arms ammunition. Third, the service industries and other sectors, the expansion of which had been held down by priorities and allocations, naturally increased their relative importance in the economy once the war was over.

From mid-1946 until the fall of 1948 the abnormal backlog of domestic and foreign demand and the rapid decontrol of prices in the United States led to unexpectedly strong and sustained inflationary pressures in Canada. High levels of activity in the United States and credits to overseas countries stimulated exports, consumer spending increased modestly in real terms and investment rose by about one-third. Demand in fact increased much faster than available resources, and prices rose by a third. The strain of trying to do too much was also reflected in sharply increased imports and led to the introduction of anti-inflationary measures and the imposition of trade and payment controls. However, from late 1948 until mid-1950 inflation was

checked, prices remained practically unchanged, and controls were gradually eased. Despite a slight fall in exports in 1949 the economy did not turn down with the United States inventory and investment recession, in part because of increases in government expenditures and in part because of high levels of investment in both domestic and export industries.

Secondary industry production rose by about one-eighth from 1946 to 1949 and maintained its share of national output. The industries producing durable goods grew by about 20%, or twice as fast as the non-durable industries, reflecting war-deferred purchases of automobiles and appliances, as well as increased investment in housing, plant and equipment, and social capital facilities. Production of electrical apparatus and supplies increased by one-third, the number of automobiles manufactured rose from 92,000 to 193,000, and production of farm implements nearly doubled as the mechanization of agriculture reached its peak. These increases led to a growth of nearly a million tons in steel ingot production and to substantial gains in other iron and steel industries such as structural steel, wire goods and castings. The non-durable industries showing the greatest growth were generally those producing the less essential types of consumer goods. For example, output of petroleum products increased by nearly one-third as a result of the growing use of automobiles and trucks while secondary chemical output gained 10% with declines in the production of pharmaceuticals being more than offset by gains in paints and other consumer chemicals. Textile production rose by 10% with wool declining and synthetics increasing sharply. However, the leather products industry decreased nearly 25% due to the decline in special overseas sales of footwear and, to a lesser extent, to the loss of markets through the mechanization of agriculture.

Up to the end of 1949, most secondary industries had not fully experienced the traditional peacetime pressures of import competition. On the export side, the partial loss of overseas markets due to currency shortages, restrictions and discrimination had, with few exceptions, been offset by the growth of the domestic market; this was true even though some products had enjoyed abnormally high levels of exports in 1946 to 1947 as a result of the special grants and credits extended by Canada to overseas countries. However, on the import side, the adjustment to peacetime conditions was by no means complete. Competition from overseas countries was abnormally weak because of the demands of reconstruction and the problems of inflation. The devaluations of September 1949 reflected the fundamentally weakened postwar position of most overseas countries and the deterioration of their relative productivity, but any effects of these currency changes were not immediately felt by Canadian producers. With respect to United States competition, import restrictions were in effect for most of the period, and prior to their introduction the level of demand in Canada had, in any event, been so great that domestic production had not in general been affected by the existence of high levels of American imports.

The import controls applied with particular severity to consumer products normally competitive with the output of Canadian secondary manufacturers, notably clothing, textiles, rubber products and electrical appliances. Imports of machinery and many other essential investment goods, although controlled, were for the most part subject to individual licensing which was much less restrictive in its effects than the controls on consumer goods. Despite official warnings that the controls were temporary, a certain amount of relatively high-cost production was developed in Canada behind the shelter that they offered, partly by Canadian producers and partly by United States branch plants manufacturing goods previously imported; some of this production did not long survive the removal of import restrictions. Although this reduced level of foreign competition from both American and overseas sources affected individual products differently, its over-all result was to mask somewhat the effect of the 1946 appreciation of the Canadian dollar and to soften the immediate impact of the reductions in tariff protection, which occurred both as a result of the negotiations under General Agreement on Tariffs and Trade (GATT) and as a result of the effect of rising prices on specific duties. (Specific duties are those set at a fixed dollar amount per unit rather than at a percentage of value; in the Canadian tariff they apply to a number of iron and steel, textile and other products.) It should be noted here that the ultimate impact of tariff and exchange rate changes on a number of secondary industries may well have been less than the impact caused by the control of domestic inflation, the removal of import controls and the reconstruction of overseas economies; in any case, these latter factors must be kept in mind when reviewing trends in the level of protection against imports in recent years.

Stimulated by a pronounced upturn in United States economic activity, the Canadian economy resumed a more vigorous rate of growth in the first half of 1950. The outbreak of the Korean War further intensified this expansion and brought about a further sharp growth of secondary industry. The gain in real output in this sector was just over 25% in the period from 1949 to 1953, or slightly more than for the economy as a whole, while employment returned to its wartime high. The resurgence of inflationary pressures and the development of worldwide shortages that accompanied the outbreak of hostilities tended to reduce foreign competition in the Canadian market, at least at first. However, the strong demand stemming from defence programmes, combined with the use of fiscal and monetary means to control inflation, quickly brought about dramatic increases in production in the overseas countries as well as in Canada and the United States. Together with the 1949 currency changes, the appreciation of the Canadian dollar following its temporary devaluation in 1949, and the gradual removal of Canadian import restrictions, this greatly increased the ability of foreign producers to compete in the domestic market. As a result, imports by 1953 had risen more than one-third in real terms from their abnormally low levels in 1949.

Most domestic secondary industries consequently found that the total Canadian market had grown substantially but that their share of it was considerably lower than it had been in the earlier postwar period.

The main dynamic of the economy in 1950 was rising consumer spending, particularly on such durable goods as automobiles and appliances, but in 1951 and early 1952 new impetus came from the build-up of the defence and defence supporting industries; government expenditures rose by more than 50% in real terms with the total reaching its peak in 1952. Increasing demand for raw materials, particularly strategic metals and minerals, led to a sharp increase in exports of the primary manufacturing and resource industries, and the real volume of exports rose more than 20% between 1950 and 1952. The growth of the defence and export industries, together with a growing awareness that many raw materials produced by Canada were likely to be in short supply over the long run, in turn contributed to a substantial rise of nearly one-third in real investment in both plant and equipment in the three years ending in 1953. Partially due to a very rapid rise in output per man-hour after 1949, and to an improvement in the terms of trade, the expansion of the economy was so great that, despite the rise in defence expenditures, additional resources were available for the use of the civilian sector by the first part of 1952. Consumer spending, which remained stable in real terms in 1951, rose by over 11% in the following two years as a result of sharp rises in personal income, reductions in income and excise taxes, slight price declines and the relaxation of the credit controls imposed in 1951.

The pattern of development followed by individual secondary industries up to the end of 1953 reflected these changes in the composition of national spending as well as the sharply rising incomes available to Canadians. Industries producing non-durable goods, the consumption of which tends to rise rather more slowly than incomes, for the most part showed gains of less than 10% from 1949 to 1953 compared to the over-all gain of more than a quarter in the output of the secondary sector as a whole. In this group were bread and bakery products, beverages other than distilled liquor, sugar refining, miscellaneous foods, leather and paper products, textiles and clothing. Output of the latter industry had risen 5%, but production of primary textiles was practically unchanged, with consumption rising 10% to 408 million lbs. in 1951 as a result of defence orders and then falling back to 380 million lbs. in 1953; at the same time its share of the domestic market fell by five percentage points to 72.5%. Among the non-durable goods industries showing relatively large increases in this period were tobacco and liquor, the latter partially as a result of increased exports. Rubber products were up more than a quarter as a result of increased output of tires, tubes, and other products excluding footwear. Secondary chemicals showed an increase of more than a third, reflecting gains in all consumer products as

well as increased output of munitions, while petroleum products rose by 50%.

The durable goods industries showed the greatest gains in this period; the rise in their output was just under one-third in real terms. This increase reflected higher consumer spending on furniture, appliances and cars, rising outlays for defence, and increased investment demand. Thus production of non-metallic mineral products rose by half as a result of the growth in housing and construction; and the output of automobiles increased from 193,000 units in 1949 to 284,000 in 1950 and to 360,000 in 1953. Production of electrical apparatus was nearly half as great again as in 1949 due to increases in appliance sales, particularly of television sets, as well as to very substantial gains in electronic production for defence purposes. Also contributing to this expansion was a large increase in sales of heavy electrical equipment and wire and cable used in hydro-electric development and in capital expansion programmes generally. Increased defence expenditures were, of course, directly responsible for the fact that output of both the aircraft and shipbuilding industries approximately doubled between 1950 and 1953; however, production of these industries was still less than one-half and one-third respectively of the high levels reached in the Second World War. Production of steel rose to 4.1 million tons and other iron and steel products industries also increased their output noticeably as a result of defence and investment spending. For example, industrial machinery output rose by two-thirds in value terms, with gains being especially pronounced in mining, metallurgical and oil-well machinery due to heavy investment outlays in the resource industries. The outstanding exception to the trend among the durables industries was the agricultural implements industry, output of which fell by nearly a third in real terms reflecting a decline in farm income and completion of the main postwar surge of mechanization in agriculture. However, the over-all position of secondary industry was a strong one, for the growth of the Canadian market between 1949 and 1953 and the development of more competitive conditions had brought about further significant increases in production, technical skills, and efficiency.

The postwar growth of secondary industry was interrupted by the brief recession in economic activity which lasted from the third quarter of 1953 to the latter part of 1954. As in the United States, which had turned downward slightly earlier, this was brought about in the first instance because the slack created by falling defence outlays was not taken up by a new dynamic. In Canada this softening was intensified by a 5% fall in exports to the lagging United States economy from the third quarter of 1953 to the similar period in 1954, and by a marked decline in farm income due to a relatively poor crop. The effect in both countries, however, was much the same—a sag in activity as involuntary inventory accumulation was worked off, a corresponding decline in confidence, and an induced fall to business investment

which in Canada amounted to some 10%. Unemployment rose considerably although total real output in this country fell by only 3% because of moderately increased consumer spending, rising outlays for social capital purposes by junior levels of government, increased housing construction, (stimulated by amendments to the National Housing Act in 1954) and a decline in imports.

The decline in secondary industry in 1954 was considerably greater than that of the rest of the economy, amounting to about 8%; this contrasts sharply with the practically unchanged output of the non-agricultural sector as a whole and with modest increases in the resource and primary manufacturing industries. The reasons for the more pronounced decline of secondary manufacturing can be traced to the fall in defence spending, the decline in investment, particularly the fall of 12% in new machinery and equipment expenditures, and the moderate decline in consumer spending on durable goods; as a result of these factors inventories were found to be somewhat larger than in other sectors. Slight increases in total consumer spending were, therefore, not reflected in higher output due to the fact that consumption was in part accommodated by the working off of inventories. The secondary industries most affected by these developments were generally those producing durable goods for consumers, defence, or investment. Ingot production of the primary iron and steel industry fell by one million tons to its 1949 level, output of other iron and steel industries fell by 10%, aircraft and shipbuilding production each declined by about one-seventh, and the number of trucks, busses, and military vehicles produced fell by some 40%. Agricultural implement output, reflecting the sharp fall in farm incomes, decreased by nearly one-quarter to just more than half its peak of four years earlier. However, the electrical industry declined by only 2%, with increased production of television sets offsetting the effect of rather sharp falls in the production of most other appliances. Automobile production fell by one-fifth from its 1953 level. One of the few industries in the durables group to show any increase was building products, output of which rose very slightly in response to the increase in residential construction.

The industries producing non-durable commodities fared somewhat better, particularly where their output was of a type that did not lend itself easily to inventory accumulation or where production had been closely geared to sales in the earlier period. Thus, both the secondary food and paper products industries had practically unchanged levels of production in 1954, and printing and publishing production and tobacco output rose slightly, the latter due to a cut in taxes and a decline in smuggling. The petroleum products and chemicals industries continued to show gains, although they were smaller than in previous years. However, output of the rubber industry declined somewhat due to the fall in vehicle production, and distilleries showed a small decrease in output mainly because of a fall in exports. Pro-

duction of the clothing, textile, and leather products industries declined somewhat more, the falls amounting to 13%, 14% and 6% respectively; as in the case of most consumer durables industries, these declines in consumption and output were partially attributable to the relatively large amounts of personal income being absorbed by the purchase of television sets.

While it has been suggested that part of the decline in the production of secondary industry in 1954 was attributable to the fact that imports claimed an increasing share of the Canadian market, the available statistics do not bear out this contention. Indeed, if they suggest anything it is the reverse. Examples of stable to slightly declining import shares in 1954 were industrial machinery, primary iron and steel, textiles, rubber products, electrical apparatus and chemicals. Imports, of course, did not account for a declining proportion of the market for every product, and among the exceptions were structural steel, miscellaneous electrical apparatus and rubber footwear. Nevertheless, Canadian secondary industry generally more than held its share of the domestic market. However, as noted above, output and sales of most industries declined noticeably and there was a marked increase in domestic competition. This, together with the existence of excess capacity in other countries, particularly the United States, led to increased pressure on prices and brought about marked reductions in the profits of many Canadian producers. Thus, the combined effect of import pressure on prices and considerably more competitive conditions in Canada itself caused Canadian producers to be more aware of foreign competition than in the previous year, despite the slight decline in the proportion of imports. It appears nevertheless that production and profits of most secondary industries in the recession of 1954 were in large measure determined by conditions in the domestic market and the Canadian economy as a whole, and that the decline in Canadian demand had a greater impact on the fortunes of secondary industry in that year than changes in the severity of import competition.

During the recession the use of easier monetary policies and increased government unemployment and welfare payments helped to sustain activity in both Canada and the United States, particularly through their effects on house building, on capital expenditures by junior levels of government, and on personal disposable income. By late 1954 an upturn occurred in the United States as the decline in national security expenditures and inventories came to a halt and rising expenditures on housing and consumer durables, particularly automobiles, began to make themselves felt. The United States recovery then broadened out to include all consumer expenditures and investment, the latter reflecting increased consumer sales, applications of new technology, and pressure on labour costs. In Canada recovery was somewhat slower in taking effect, although the growth in real output between

1954 and 1955 was considerably greater, amounting to nearly 9% as compared to 6% in the United States. The seasonally adjusted pattern of expenditures on defence, inventories and housing was similar to that in the United States, but the upturn was reinforced by a rise in exports in the first quarter of 1955. This trend continued through most of the year and reflected increasing levels of activity in overseas countries as well as south of the border. Together with the impact of increased United States confidence and consumer spending, this led in the second quarter to a very marked upturn in Canadian consumer expenditures. Cuts in direct and excise taxes in the 1955-56 federal budget probably spurred these expenditures somewhat. In any event, rising levels of consumption, export, and other spending, together with increased confidence about Canada's long-term prospects, led to a sharp increase in capital outlays. By the end of 1955 pronounced growth was taking place in almost every sector of the Canadian economy. The expansion continued throughout 1956 with business investment and merchandise exports providing the main impetus, although consumer and government spending also continued to increase. For 1956 as a whole, real Gross National Product was some 7% higher than in 1955.

These rising levels of activity were reflected in the secondary industry sector. In 1956 the published indices of industrial production indicated that output in secondary industry was at a level some 16% to 17% above its relatively low 1954 level, about the same increase as in real Gross National Product. Measured from the previous peak of 1953 when production was swollen by defence orders resulting from Korea, the gain in secondary manufacturing amounts to around 8%, or considerably less than the rise of 14% in total real national output in the same period. The broadening out of Canada's economic recovery and the increased demand for consumer and investment goods caused output of secondary industry to rise steadily throughout 1955, although the increase was not quite equal to that of the economy as a whole. Among the industries making the greatest gains were those producing consumer durables or related items, particularly automobiles, the production of which grew by about one-third; those producing goods used extensively in housing and other forms of construction; and, finally, those industries producing materials for use in investment and consumer durable goods—for example, primary iron and steel output rose from its comparatively low levels of the previous year to a record high of 4.5 million tons. Most other industries, including those affected by inventory disposal in 1954, showed relatively smaller, although significant gains, the principal exceptions being the railway rolling stock, aircraft and shipbuilding industries, all of which showed quite marked declines in the absence of enough new orders to maintain production.

In 1956 the indications are that output of secondary industries rose slightly faster than that of the economy, despite the increase of imports to a record level. To some extent, as will be pointed out in a later chapter, this

increase in imports reflected the traditional mechanism of adjustment to capital inflows and boom conditions in the resource and export industries. Such an adjustment has characteristically been of a temporary nature and does not necessarily imply any long-run deterioration of the competitive position of secondary industry. In the investment goods industries, reflecting heavy capital spending, a very substantial increase took place in primary iron and steel production and in all classes of iron and steel products. Railway rolling stock and aircraft production also recovered sharply. In the consumer goods field, durables on balance maintained their high levels of the previous year while significant increases occurred in a wide range of industry. For the sector as a whole, the growth of incomes, population, and the market more than compensated for the decline in the share of the market obtained by many domestic industries.

Summary

It is clear that secondary manufacturing industry has undergone a substantial and solidly based expansion both in the war and postwar years. This growth, as in earlier years, has paralleled and reflected the rates of growth and the prosperity of the economy generally. Our primary concern, however, is to measure and put in perspective the growth of domestic manufacturing since 1939, during which time, as the following tables show, its real output has almost tripled.

Table A

PERCENTAGE INCREASE IN POPULATION, G.N.P. AND OUTPUT OF SECONDARY MANUFACTURING

	1939-56	1946-56	1949-56
Population (June 1).....	42%	30%	19%
Gross National Product (1935-39 dollars)	142%	51%	41%
Secondary manufacturing (Gross Domestic Product)	176%	53%	35%

NOTE: Secondary manufacturing estimates for 1956 were made by us on the basis of preliminary data.

Table B

SECONDARY MANUFACTURING GROWTH COMPARED WITH SELECTED SECTORS

(percentage increase in Gross Domestic Product)

	1939-46	1946-55	1939-55
Secondary manufacturing	81%	40%	154%
Agriculture	—10%	19%	7%
Resource industries	15%	97%	127%
Primary manufacturing	58%	48%	134%
All services	59%	37%	118%

This gain has considerably outdistanced that of the Gross National Product, population, and other industries. Of course, a substantial portion of the total growth occurred in the war years and was partially made possible by the existence of excess capacity in 1939. Yet this latter condition was true in varying degree for other sectors as well, and even the choice of the postwar year of 1946 showed that the permanent gain achieved in this period was a significant one. In the postwar decade the growth of domestic manufacturing in absolute terms has been greater than that of the previous seven years, although the percentage gain has of course been smaller. In fact, expansion from 1946 to 1956 has been slightly larger than that of real national output, despite some reductions in tariffs, the removal of exchange controls, and the recovery of overseas countries. In this period only the growth of primary manufacturing and the resource industries surpassed domestic manufacturing. This was due in part to the fact that both the former sectors were at abnormally low levels in 1946. In the resources sector, however, a rapid rate of postwar growth has also been due to favourable export markets and domestic discoveries and utilization of metals, gas, oil and hydro-electric power. Even in the six years following 1949 when the demand for exports and the effects of import competition were felt most intensely, the growth of secondary industry has not been much below that of the economy as a whole, ranking third among the commodity producing sectors after construction and the resource industries.

Within the totals of secondary manufacturing output, as we have tried to indicate, changes have occurred in the relative growth and importance of different industries and products from one period to another. We did not have the time, space, or expertise to trace out and analyze all these changes in a detailed way, and accordingly have not appended any detailed statistical material on a product basis. Detailed and comprehensive product data are set out in the Commission's industry studies, in many of the briefs received, and in the excellent industry bulletins issued by the Dominion Bureau of Statistics. However, the basic growth factors have been the changing pattern of demand which we have attempted to describe; the successful development of new technology, products and processes; and the ability of individual industries to compete for the resulting demand. The competitive position of secondary industries will be discussed more fully in later chapters, but the following table shows the changes in rankings of a broad group of industries in 1939, 1946 and 1953.

With growing industrialization and rising incomes there has been a relative decline in the importance of industries manufacturing the basic necessities of life such as foods, textiles, clothing, tobacco and leather products. At the same time there have been pronounced increases in the relative importance of industries producing consumer durables, such as automobiles and electrical apparatus, on which a rising proportion of incomes is being

spent. The growing importance of construction and investment generally has been responsible for the increase in the rank of non-metallic mineral products and primary iron and steel, while defence orders and development of new products and technology have clearly been an important influence on such industries as aircraft and electronics.

Table C

INDUSTRY RANK OF SELECTED SECONDARY MANUFACTURING INDUSTRIES

(by Gross Domestic Product)

	1953	1946	1939
Motor vehicles and parts.....	1	3	3
Electrical apparatus and supplies	2	4	7
Clothing (textiles and fur)	3	1	1
Textiles (except clothing)	4	2	2
Printing, publishing etc.	5	5	4
Chemicals (secondary)	6	7	5
Beverages	7	6	9
Aircraft and parts	8	19	19
Primary iron and steel	9	12	10
Non-metallic mineral products	10	15	14
Products of petroleum and coal	11	17	12
Railway rolling stock	12	9	14
Industrial machinery	12	10	13
Non-ferrous metal products	14	12	16
Bakery products	15	14	10
Miscellaneous foods	15	16	8
Leather products	15	8	6
Shipbuilding	18	11	21
Rubber products	19	18	17
Agricultural implements	20	20	20
Tobacco products	21	21	18

Moreover, within industries very different rates of growth have taken place. In primary textiles, production of woollens in 1953 had shown practically no increase in poundage terms while the synthetics, which use newer technology and have developed new markets, were being produced at a rate more than four times that of 1939. Within the industry classified as products of petroleum and coal, petroleum products have risen three times as fast as coal products due among other things to their more rapidly growing demand, the discovery of Canadian resources, and a successful record of cost control and technological improvement. Within the rubber industry, output of tires and tubes has risen more than four times faster than that of rubber footwear since 1937 due both to relatively more rapidly rising demand and to the fact that domestic rubber footwear production has become less competitive with foreign production; in the primary iron and steel industry, the growth of the market, more enterprising management, and new technology has led to the extremely rapid growth of many products not even produced in Canada in 1939. These are only a few examples, but they serve to illustrate the great disparities in rates of growth of individual products, the differing

demand conditions which each has faced, and the varying effect of technology and costs on the progress, or lack of it, of various secondary industries.

The pattern of employment within secondary manufacturing has followed the broad trends of output and technological improvement recorded by individual industries and is shown in Table 9. As far as total employment in this sector is concerned, it has nearly doubled since 1939 to more than 1,100,000 persons in 1956. Although this gain is relatively greater than that achieved by the other principal sectors of the economy in the same period, it is considerably less than the rise in manufacturing output; this of course is due to the continuing increases in output per man-hour which have taken place since 1939 and which are discussed in Chapter 7.

The following table summarizes the percentage contribution of secondary industry and other sectors to national output and employment in 1939 and 1955, using Gross Domestic Product and labour force data:

Table D

		1939	1955
Secondary manufacturing	G.D.P.....	16.4%	20.4%
	L.F.	14.2	19.7
Primary manufacturing	G.D.P.....	5.9	6.8
	L.F.....	4.1	5.9
Resource industries	G.D.P.....	8.4	9.4
	L.F.....	5.7	5.6
Agriculture	G.D.P.....	22.9	12.1
	L.F.....	32.5	15.3
Services and other	G.D.P.....	46.4	51.3
	L.F.....	43.5	53.5

We have attempted to describe in broad terms the expansion of secondary industry and to show how it has been related to the expansion of the economy as a whole. We have not, however, tried to probe behind the immediate manifestations of growth in search of its elusive and fascinating ultimate causes. Nor have we attempted to describe the intricate and interlocking processes by which economic growth spreads and by which it is enabled to feed upon itself. Behind the growing markets for Canadian products lies the fact that people in Canada and elsewhere throughout the world have come to place an increasing value on a rising standard of living. This in turn is related to people's attitudes towards economic growth, risk taking and savings; to the development of sound social institutions and government policies which encourage rather than restrict growth; to the accumulation of capital, the process of innovation and progress in technology; to the growth of population, labour skills and management ability; and to the discovery and utilization of resources.

While it is easy to list some of the main determinants of growth, it is less easy to establish which is cause and which effect, or to determine the precise relationship between them. For example, Canadian population has grown very rapidly in the last ten years and the rate of family formation is some three times as high as in the depression of the 1930's—in large measure this has been a reflection of prosperity, yet at the same time it has been an important contributor to it. Similarly, the discovery of new resources has been facilitated by technological advance and by new markets, but the existence of resources in turn has spurred the search for still newer uses and methods of processing. While these are but two examples, the same conditions apply equally to all of the other factors mentioned above, and one can only conclude that the process of growth involves many inter-acting relationships, the nature of which is constantly shifting and within which any one factor may be both cause and effect.

To say this is not to deny that any conclusions can be reached about the factors affecting the growth of Canadian secondary industry. It is clear that the principal cause of its growth throughout our history has been the buoyant expansion of the economy as a whole. In contrast to earlier times, however, the postwar period has been characterized by a marked increase in the ability and in the determination of governments and peoples to maintain high levels of incomes and employment, not only in Canada, but elsewhere as well. This fundamental change in the economic climate has strengthened confidence and has introduced a measure of stability to growth that was lacking in earlier periods of our development. Full employment policies have not, of course, replaced the special impetus to growth which Canada receives from strong and growing export markets and from investment stimulated by confidence in the prospects of our export and resource industries. Indeed, insofar as they have strengthened and stabilized growth in other countries, particularly the United States, these policies have enhanced the long-run outlook for Canadian exports and for Canadian growth generally.

It is true that Canada's dependence on foreign trade has been lessening and her ability to withstand outside fluctuations is undoubtedly increasing. Nevertheless, one of the basic reasons why Canadian economic progress has been more rapid than that of most other countries during the past decade is the special dynamic stemming from the prosperity and high levels of activity in our export and resource industries which directly account for about a quarter of new capital investment and over two-thirds of electrical power consumed. Although direct employment in this sector is relatively small, about 10% of the national total in 1955, it has very large indirect effects on employment in construction, service industries, the capital goods industries and the whole range of secondary industries which supply manufactured industrial products and consumer goods to meet the demands created by the initial impact of growth. In turn, this growth spreads throughout the economy in the form of demands for still more consumer and investment goods and

for roads, schools and community facilities of all kinds. The potential of the economy for further expansion is increased by the stimulus that favourable opportunities give to population growth, immigration, the acquisition of new skills, and the inflow of foreign capital. The development of Alberta since the discovery of new oil fields in 1947 is a good example of this process on a smaller scale.

There are many contributors to this growth process, as we have tried to indicate, including governments, consumers, and every sector of industry. Secondary industry, while of course deriving much of its growth from the prosperity of the economy as a whole, in turn makes an important contribution to that prosperity. We have pointed out that a large part of the output of such secondary industries as iron and steel, electrical equipment and industrial machinery, indeed of the capital goods producing industries generally, depends on markets outside secondary industry, particularly in the primary, resource, and construction sectors. It is also true that sales of many consumer goods are linked to incomes created in sectors other than secondary manufacturing, whether as a result of private or governmental spending. At the same time, it should be emphasized that domestic manufacturing has contributed substantially to its own growth and to that of the economy as a whole by its expenditures on investment, wages and materials. As secondary industry has assumed a greater place in the economy its influence on the mechanism of expansion has increased correspondingly.

Although the prosperity of the economy has been the dominant influence on the growth of Canadian secondary industry, a special stimulus came from the Second World War. As we have pointed out, secondary industry reached very high levels of output during the war years, but these levels of production were achieved in part due to emergency conditions and a complex system of priorities, allocations and controls.³ Although a few industries based on defence orders have never regained their wartime prominence, the real and lasting growth that occurred in the war years should not be underestimated. In 1946 the output of secondary industry was almost double its 1939 level and its share of national output had risen from 16% to 20%. These wartime gains were in part the result of attaining high levels of income and employment, but they also stemmed from the experience, capital, skills and confidence acquired in war production. Tangible evidence of the permanence of these gains is provided by the fact that a substantial portion of our war-expanded manufacturing facilities found a profitable use in the postwar period under normal Canadian competitive conditions, and by the fact that almost all industries in the secondary sector have surpassed even their peak levels of 1944. This postwar growth has approximately paralleled that of United States secondary industry in percentage terms, and has given Canada the world's second largest domestic manufacturing industry on a per capita basis.

³Attention has already been drawn to the limitations of the wartime production statistics.

A second special factor affecting the growth of secondary industry has been the tariff and other forms of protection, but we have not stressed its role in the last two decades of growth. This is not because we wish to minimize the importance of protection in enabling many of our domestic manufacturers to capture a larger share of the Canadian market than would otherwise be the case, but rather because protection has on balance been reduced throughout the period. It is interesting to note that this was true also of the two previous periods of Canada's and secondary industry's most rapid growth, the first decade of this century and the 1920's. However, the existence of the tariff was important in broadening the range of our manufacturing industry in earlier days, particularly in the period when Canada lacked entrepreneurial and technical skills; more recently also, tariff changes have been of some significance to new industries and products, although tariff levels generally have tended downward. Many secondary industries could not exist or grow without a basic framework of protection, but, with very few exceptions, tariffs cannot be said to have been in the last two decades either an independent source of demand or a dynamic determinant of growth for domestic manufacturing. The effects of tariffs, tariff changes and other protective factors on a number of individual industries are discussed in later chapters.⁴ However, it may be noted here that the growth of secondary industry in a period of falling protection serves to emphasize that it has been the growth of domestic incomes, population and employment—in short, the growth of the real purchasing power of the Canadian market—that has been of overriding importance.

This growth has led to a great increase in the variety and complexity of manufacturing operations which can be efficiently undertaken by secondary industry in Canada, and has strengthened the ability of domestic manufacturing to compete effectively with foreign competition. Of course, no industry has ever been entirely free of problems and some have been unable to adapt themselves satisfactorily to changing demand conditions; this is inevitable in a dynamic and expanding economy. However, a balanced view of growth cannot be obtained by looking only at individual industries; viewed in the wider perspective of total achievement, the gains of Canadian secondary industry throughout the period have been impressive indeed.

⁴For a full discussion of these subjects, see *Canadian Commercial Policy*.

EXPORTS, REGIONAL CONCENTRATION, CAPITAL INVESTMENT AND IMPORTS

THIS CHAPTER considers some special aspects of the development of secondary industry—exports, regional concentration, capital investment and imports. It should be noted that a more detailed analysis of these topics as they related to the Canadian economy as a whole will be found in other studies published by the Commission. However, some discussion of these subjects is essential for purposes of this study, for an understanding of them not only throws additional light on the past growth of secondary industry, but contributes to a better appreciation of its present competitive position.

In this latter connection, the section on imports is of particular significance. Canadian secondary industry, with the exception of production of an essentially local nature, has throughout its history developed in the face of competition with imported goods. To a considerable degree, fluctuations in the import share of the market for products of secondary industry provide a measure of changes in the competitive position of Canadian producers. The relative cost position of Canadian manufacturers of course ranks with the growth of the Canadian market as one of two basic determinants of the past and prospective development of our secondary industries. However, the import section of this chapter is confined primarily to a presentation of the main statistics and broad economic background of Canada's manufactured imports. As such, it is designed to serve as an introduction to the chapters which follow on the relative costs of manufacturing in Canada.

Exports

Export sales have never accounted for a very significant part of the gross value of production of Canadian secondary manufacturing industry. Because of classification differences between production and trade statistics it is not possible to determine the exact proportion of secondary manufacturing production exported. In 1953, the last year for which both statistics are available in final form, these exports appear to have totalled between \$725 and \$750

million, or some 6% of secondary industry output, although they accounted for between one-fifth and one-sixth of Canada's total merchandise exports. Moreover, the relative importance, but not the absolute size, of export markets as an outlet for the goods of domestic manufacturing has been declining somewhat over the long run; in 1929 about 7.5% of production was exported, by 1939 the percentage had fallen below seven and by 1955 appears to have declined to just under 6%. However, as will be pointed out below, this decline is more than accounted for by the drastic fall in the importance of manufactured exports to the United Kingdom and to a lesser extent to the overseas countries.

In contrast, the percentage of production of many domestic manufacturing industries exported to the United States has risen since 1939. Nevertheless, two very important factors have for nearly 100 years made it difficult to sell manufactured goods in the United States. These are the comparatively high costs and prices of Canadian production and the barriers to trade resulting from American commercial policy. Nor are these two factors unrelated, for our secondary manufacturing producers are unable to achieve the economies of large-scale production in the comparatively small Canadian market alone. This, as indicated in Chapter 4, is responsible in large measure for the higher level of domestic manufacturing costs in this country. There is no doubt, and this has been stressed to us by many Canadian producers, that easy access to the high-volume American market would permit many products of secondary industry to compete very effectively in that market. Indeed, the American market has always been the most natural outlet for exports of Canadian secondary manufacturing, in view of the fact that it is large, comparatively near, and easy to service. In addition, Canadian producers are familiar with American requirements and tastes as well as with American production and selling techniques. At the present time, for example, typewriters have free access to the United States market and at least one firm located in Montreal supplies the whole of the northeastern United States market for portables from this plant. Because of lack of precise cost data and other information, however, it is not possible to determine what the exact effects of easy access to the United States market might be on the costs and exports either of other individual secondary industries or of the sector as a whole. While exports would undoubtedly rise sharply, it is clear that there would continue to be numerous secondary industries where exports would be negligible or non-existent. Indeed, the expansion of some industries would undoubtedly involve the contraction of others. Many United States industries, particularly in the fields of consumer durables and industrial equipment, now use little or none of their protection, and some Canadian industries do not have as ready access to specialized markets or to pools of labour with particular technical skills. Moreover the essence of comparative advantage is that it cannot exist for every activity within a country, and it would un-

doubtedly remain true that much of Canada's economic advantage would continue to be found in her resource and export industries.

Whatever the effect of such changes might be, it is nevertheless clear that United States tariff and commercial policy has in the past severely limited the exports of many Canadian secondary industries and thus hindered their development in Canada. In fact it has probably impeded the growth of this sector more than the Canadian tariff has stimulated it. This applies particularly to those secondary industries based on the fabrication of resource products such as metals, forest products and petro-chemicals. It is also true, however, for many non-resource based products against which United States producers use their protection in order to keep out Canadian competition, for example in a number of textile, primary iron and steel electrical equipment, and other items.

Like Canada, which is also a substantial importer of raw materials, the United States generally admits essential industrial materials and other goods in which she is deficient at free or negligible rates of duty. Much higher rates are charged on manufactured goods which can be produced domestically, albeit at higher cost. Thus newsprint enters the United States free of duty while many types of finished paper are charged up to the equivalent of about 35% ad valorem; primary copper enters free while copper wire bears rates of 15% to 17½%; aluminum ingot pays about 5% while general manufacturers of aluminum pay 22½%. As a result one finds in 1952, for example, that of \$44 million of aluminum exports to the United States only \$4 million was semi-fabricated and less than \$3 million was fully manufactured; of \$54 million of asbestos exports, less than half a million dollars represented finished manufactures.

United States rates on non-resource based domestic manufactures vary considerably. They are between 10% and 12½% for many primary iron and steel items, between 10% and 15% for most types of non-farm machinery and between 10% and 17½% for much electrical machinery and apparatus. However, rates of between 50% and 100% are not uncommon for a wide variety of manufactured consumer goods. Account must also be taken of administrative restrictions, classification and valuation problems, legislative enactments such as the Buy American Act, and other pressures on American users, all of which are employed to limit imports of manufactured goods. Many witnesses have stressed that the resulting uncertainties are a more important deterrent to exports than the tariff rates themselves. In any event, given the cost disadvantages which generally prevail in Canada, almost any restrictions on entry into the American market are bound to seriously curtail or eliminate trade, and in turn this lack of trade reflects back on Canadian costs of production.

In addition to the two basic factors of higher domestic costs and United States barriers to trade there are a number of other less important factors which from time to time affect exports of secondary manufactured goods to

the United States. The exchange rate is one of these, but as the average rate from 1952 to 1956 was only some 2% higher than its average level from 1934 to 1939 it is most unlikely that this has had more than a marginal effect. Even over shorter periods when exchange rate changes have been considerably greater it is hard to find evidence that this has had a very significant impact on the volume of secondary manufactured exports. A second factor is the control of export sales exercised by American parents on their Canadian subsidiaries. This subject is dealt with at some length in the Commission's study on *Canada-United States Economic Relations* where it is noted that "some companies with subsidiaries in Canada . . . [encourage] these subsidiaries to compete actively with one another and with the parent . . . On the other hand many such companies prefer to allocate markets among their subsidiaries . . ." It is noted further that this market allocation in many cases simply recognizes the facts of competitive power in that the subsidiary often cannot meet the prices of the parent in export markets because of higher costs or tariff obstacles. While instances of restrictions of export sales are known, on balance this factor does not appear to us to be very important in the secondary manufacturing sector.

The view has also been expressed that exports of secondary industry to the United States are not as high as they could be because aggressive action is not taken by Canadian manufacturers to follow up every favourable opportunity available to them. This factor has probably not been very important on balance, although it has been significant in a number of individual cases. Nevertheless, although the various escape provisions of the United States tariff have not been invoked against secondary manufacturing, there is a general feeling that if a manufacturer is successful in gaining entry to the United States market, administrative measures may be used to ensure that this success is not a lasting one. In such instances, uncertainty about United States commercial policy tends to contribute to a somewhat defeatist attitude on the part of some Canadian manufacturers.

It should be emphasized, however, that there have been considerable reductions in United States tariffs in the last two or three decades. For instance, the rates on transformers and parts and electric stoves have been reduced from 35% in 1930 to 25% in 1939 and 12½% in 1948. On pulp and paper machines, rates have been reduced from 27½% to 10%, and on iron and steel sheets tariffs have been cut from approximately 20% to approximately 10%. There has also been some easing of administrative restrictions, of which the recent appointment of a United States customs official to facilitate Canadian sales in the American market is an outstanding example. Perhaps more importantly, there has been a considerable improvement in the cost position of many Canadian producers in the last two decades. The combination of all these factors has contributed to a marked rise in the proportion of secondary manufacturing production being sold in the United States. Thus

one finds that in 1953 the proportion of all Canadian alcoholic beverage production exported to the United States was nearly double that of 1939. The share of rubber products output sold in American markets had risen five times although it is still only some 1½%; and the proportion of export in the electrical apparatus supplies industry had risen many times, although it also accounted for a very small share of the gross value of output in 1953. Other broad groups in which the proportion of production sold to the United States has increased include leather products, textiles, farm implements, primary iron and steel, paints and varnishes and a wide range of diversified manufactures. Exports of the secondary manufacturing sector have thus followed the pattern of Canadian exports as a whole in that an increasing proportion of foreign sales, and in many cases of domestic production as well, is going to the United States market. It should not be inferred from this, however, that trade barriers have become insignificant. The fact remains that most Canadian exports of secondary manufacturing production are still confronted with formidable tariff obstacles in the United States, and that such exports account for only about 3% of the sector's output.

Exports of the secondary industry sector to overseas countries have shown a sharp fall in relative importance since the war; indeed in some cases there has been a marked decline in dollar terms despite the price rises of the intervening years. The importance of these declines can be judged from the fact that in 1939 sales of secondary manufacturing production to countries other than the United States were some five times as high as those to the American market. For many industries like automobiles, electrical equipment, rolling mill products, non-farm machinery, leather, textiles, and rubber, overseas sales were to all intents and purposes the only prewar export markets. In 1953, by contrast, it appeared that over half of all secondary industry exports went to the United States. Exports of rubber, leather and textiles and clothing products to both the United Kingdom and third countries are now lower in value than before the war and, of course, sharply lower in volume. In a wide range of industry such as iron and steel products and farm implements the proportion of production exported overseas is very much lower than it was 15 years ago. This has been particularly true of the United Kingdom although it also applies to most other overseas countries. In general the only exceptions are those countries in a strong external trading and financial position.

The main reasons for this decline are, of course, the exchange and import controls and the restrictions and discrimination of overseas countries against dollar commodities since the end of the war. In turn this reflects a relative weakening of the productive and export capabilities of these countries, and thus a decline in their relative ability to pay for imports. However, direct controls have tended to intensify these difficulties for many countries by leading to some misallocation of resources. In contrast, West Germany

and some other countries have improved their position in recent years as a result of increasing reliance on fiscal, monetary, and other more basic measures to control inflation. Despite these improvements the impact of overseas restrictions on exports of the products of our secondary manufacturing continues to be severe, partially because of the manner in which these restrictions have been applied. Discrimination is least stringent against essential raw materials and capital goods, while bearing most heavily on luxury items such as consumer durables in which Canada had built up substantial markets before the war, and on light manufacturing like textiles, rubber products and leather goods in which domestic production is encouraged regardless of cost. As a result, particularly in the United Kingdom market, Canadian exporters of many products have been almost entirely replaced by either domestic or soft currency sources since the war.

Two other factors affecting sales to overseas markets should be mentioned. The devaluations which have occurred since 1939 have adversely affected some Canadian manufacturers in overseas markets. Nevertheless, discrimination and restrictions are still used against Canadian goods on a large scale which suggests that there is a wide range of secondary industry, particularly in the more mechanized consumer and investment goods industries, where high Canadian productivity and efficiency confers significant cost advantages on Canadian producers. Reflecting changes in the comparative cost position of Canada and other countries since the war, there has been some rise in competition from low-wage countries like Japan, Germany, and India in overseas markets. This competition mainly affects goods with a high labour content including rubber footwear, certain types of custom built electrical and industrial machinery, and some textile products. However, over the whole range of secondary industry production the ability of these low-wage countries to compete with Canadian producers has diminished rather than increased. Secondly, margins of commonwealth preference have been cut to some extent as the result both of negotiated reductions and of the impact of rising prices on specific duties. The effect of this has probably been small and the continued sales of Canadian rather than American automobiles, trucks and other goods in these markets suggests that the preferences are still reasonably effective. The retention of these markets may also be due in a few cases to the allocation of commonwealth exports to Canadian subsidiaries by their American parent.

The importance of currency and trade restrictions against Canadian secondary manufactured exports can be illustrated by comparing these exports in recent years with the record in the period when postwar loans and credits were made available to the United Kingdom and other countries. This assistance, totalling over \$2 billion, was available for the purchase of Canadian goods only and in effect temporarily increased the ability of overseas countries to pay for our manufactured and other exports from 1946 to early 1948. For example, exports of textiles and clothing to overseas countries

in 1947 amounted to some \$38 million compared to less than \$10 million in 1953; for rubber manufacturers the comparable figures were \$22 million and less than \$4 million; for motor vehicles and parts \$90 million and \$73 million, and for all types of non-farm machinery \$38 million as against \$20 million six years later. There was, however, a considerable element of artificiality in these exports during the early postwar period in that overseas requirements were abnormally high because of wartime damage to their own manufacturing facilities and because of the urgent needs of postwar reconstruction. More recently the Colombo Plan and other measures of technical assistance have been responsible for significant sales of such items as machinery, locomotives and trucks. However, certain manufactured goods in which Canada specializes still find markets overseas without being dependent on government assistance. Examples are exports of cars, trucks and parts to the Commonwealth, of locomotives to South America, of generating equipment and electric meters to the same area, and of pulp and paper machinery to New Zealand. Some of these sales are in part related to factors like the Canadian ownership of many Latin American power facilities, or to the technical assistance given to the new pulp and paper plant in New Zealand by a Canadian newsprint company.

There has also been a pronounced shift in the composition of Canadian secondary manufacturing exports since 1939 as Table 23 shows. Alcoholic beverages, farm implements and primary iron and steel which together accounted for 16% of the sector's exports in 1939, accounted for some 30% of the total in 1953. As shown in Table 24, the proportion of production exported by two of these three industries has also risen and in agricultural implements the ratio is broadly unchanged. Nor is it coincidental that access to the United States market has become significantly easier for most primary iron and steel items and alcoholic beverages since 1939; rates of entry at about 10% and 12½% respectively, are about half their 1939 levels. Agricultural machinery has had duty free entry into the United States market since 1913, but the effects of high levels of United States farm income and the development of the self-propelled combine by a Canadian company have together been mainly responsible for raising the percentage of exports in this industry which go to the United States market from 27% in 1939 to 78% in 1953. The percentage of exports directed to the United States market in the primary iron and steel industries has risen from 20% to 65% while some five-sixths of exports of alcoholic beverages also go to the United States.

The importance of electrical apparatus exports in the sector total has also risen although a number of these products have experienced a severe decline in overseas sales. The other two principal industries showing relative gains in exports are aircraft and shipbuilding, but these sales vary widely from year to year with the special military orders. It should be noted, however, that the figures include only commercial exports—military assistance

and NATO shipments have been excluded from the export figures discussed in this chapter. Exports which have declined relative to total foreign sales by domestic manufacturing include rubber, leather, textiles, motor vehicles and secondary paper products, all of which, as indicated earlier, were largely or entirely directed to overseas markets before the war. Even for those secondary industries where total exports have risen relatively, exports to overseas countries have generally fallen in terms of their percentage contribution both to the sector's exports and to Canadian production. This has been true for example of rolling mill products and industrial and agricultural machinery.

In summary, exports of the secondary manufacturing sector have, with the exception of 1946-48, shown a declining trend in relation to domestic production since 1939. Even in the years before 1939, however, there were comparatively few products where domestic costs, foreign tariff treatment, or established market connections were sufficiently favourable to permit exports to be significant in relation to domestic output. The postwar decline in the relative importance of exports has on the whole been the result of a sharp decline in sales to overseas markets offset in part by stable or relatively rising sales to the United States. While Canadian relative costs and United States tariff barriers have both been reduced markedly since 1939, these interrelated factors are still the main obstacles to entry to the American market for most products of domestic manufacturing. Canadian costs have generally improved relative to overseas producers as well, but currency and import restrictions, and the encouragement they have given to local manufacturing, have in the majority of cases sharply curtailed or even eliminated sales to those countries.

It is worth emphasizing that these developments have greatly reduced the incentive to American firms to set up new branch plants in Canada to take advantage of Commonwealth preferences, while only slightly adding to the significance of the American market as a potential source of sales for domestic manufacturing output. On balance, then, these developments have further increased the importance of the growth of the Canadian market as a determinant of the growth of Canadian secondary industry.

Regional Concentration

One of the features of secondary manufacturing's development in Canada has been its high concentration in the Provinces of Ontario and Quebec. As shown in Table 25, these two provinces had 62% of Canada's population in 1953 but accounted for some 87% of the value-added in domestic manufacturing. Indeed, even these figures understate the degree of concentration, for within these two provinces secondary industry tends to be confined to a comparatively narrow line running north and east from Windsor and Sarnia to Quebec and Sherbrooke. Furthermore, manufacturing facilities are not

evenly spread throughout this comparatively small industrial belt. One finds for example a much higher degree of industrialization in the Toronto-Kitchener-Hamilton triangle than between Oshawa and Cornwall, and there is a much greater concentration of manufacturing in the vicinity of metropolitan Montreal than in the region between Three Rivers and Quebec. Table 26 indicates that over half of all Canada's secondary manufacturing is to be found in the four metropolitan areas of Montreal, Toronto, Hamilton and Windsor. Domestic manufacturing is more concentrated regionally than any of the other commodity producing sectors of the economy in which, with the obvious exception of agriculture, the share of the central provinces does not diverge widely from their share of total population. That the resource and primary industries are less concentrated in the central provinces reflects both the location of the resources themselves and the fact that these industries usually find it economically desirable to be located at or near the source of their basic materials. Because of the relatively large amounts of investment associated with the primary industries, the construction industry is also relatively less concentrated in the central provinces. Similarly, the essentially personal nature of most of the service industries has meant that they have tended to follow more or less closely the provincial distribution of population.

The reasons for the concentration of secondary manufacturing are of course intimately connected with the nature of the industry. In general the location of secondary industries is governed by sales considerations and plants tend to be built at or near the centre of the main market to be served. This market orientation is largely due to the fact that most products of secondary industry are expensive to ship, while in contrast, raw materials, having been processed at or near their source because of their weight-losing characteristics, can be shipped comparatively cheaply. Packaging, warehousing, and the freight rate structure also combine to make it more economic to transport primary materials to the factory than to send secondary goods long distances to their markets. In Canada, the concentration of manufacturing facilities in the main market area of the central provinces, particularly southwestern Ontario, is intensified by the fact that regional markets for most products are not large enough to justify the very high costs of small scale operations involved in decentralizing production. However, some secondary industries which are strongly oriented to local markets because of the high weight/value ratio of their products or the perishable nature of their output are exceptions to this rule. Examples of such products are building materials, beer, paints, and bread. In these cases, transportation expenses and the ability to carry on production efficiently in relatively small units have led to the growth of numerous plants across the country to serve regional or local markets. This is true also of certain products of the electrical industry, particularly wire and cable.

Ready access to pools of labour to meet varying manpower requirements is also an important factor in the concentration of industry. So too is the easy availability of special skills, technical and other specialized services, and parts and other supplies in established industrial areas. Related to this is the fact that many Canadian secondary industries are subsidiaries of American companies and tend, therefore, to be located in regions which are near the parent company and the main industrial centres of the northern United States from which in many cases they draw complex parts, technical services or management and supervisory advice. The combined effect of these factors resulted in 1953 in Quebec and Ontario accounting for more than 95% of the total net value of production of such industries as tobacco, rubber, leather, motor vehicles, electrical apparatus and aircraft; data are shown in Table 27. It should also be emphasized that once an industrial complex is established, whether servicing a regional or national market, its industrial and social facilities, its supply or skills, and its parts and service industries all tend to perpetuate the pattern of industrial location. This is true not only in terms of the expansion of existing plants but in terms of attracting new ones as well. A perhaps extreme example of this is cited in the submission of the Ontario Government to the Commission where it is mentioned that the automobile industry grew in both Michigan and Ontario out of the carriage industry which was in turn based upon the regions' hardwood forests. In this connection, it might be noted that the General Motors factory at Oshawa now stands on the original site of the McLaughlin carriage works, rather than at a location closer to Detroit. It should be emphasized, however, that the main reason why the geographical pattern of this and other secondary industries has remained largely unchanged is that time and technical changes have done very little either to shift the centre of gravity of the Canadian market or to diminish the importance of locating close to the main sales area of most secondary industry production.

Table 27 shows that the percentage of all secondary manufacturing, and indeed of most individual industries, which is concentrated in the two central provinces has been broadly unchanged since 1926. In fact, no provincial decentralization of domestic manufacturing has taken place since before the turn of the century when first the development of a single Canadian market and later the growth of mass production industries and techniques made such a move economically unsound. That this pattern has continued in recent years is supported by preliminary estimates of the location of new manufacturing plants (excluding extensions to existing facilities) in the post-war period. These estimates show that one-third and one-fifth respectively of all the resulting employment has been provided around Toronto and Montreal and over five-sixths of the total has been added in the Provinces of Ontario and Quebec. As indicated in Chapter 1 the growth of the great urban areas of Canada has been associated not only with secondary manufacturing but with the resource, primary and agricultural industries and the

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main supplies of ore and coal. The other two producers are more material-oriented and while each has an edge in regional markets they are both at some disadvantage in the central Canadian market. It is interesting to note that both owe their present locations to decisions made more than 50 years ago, when steel rails were a more important product than they are today. The more labour-intensive industries such as textiles, clothing and the assembling of electronic components have tended to locate where there is an ample supply of cheap and comparatively unskilled labour. Therefore, like the United States textile mills which have moved to the south, they have attempted to stay away from industrial areas, where other firms bid up the price of labour, in favour of smaller towns where not only is labour cheaper but the selection of workers is greater. One finds, for example, that in 1953 two-thirds of Canadian primary textile employment was provided in towns of less than 50,000. If synthetic production is excluded there has over the years been a noticeable shift in textile production, as in other consumer soft goods, from Ontario to the outlying industrial areas of Quebec.

As one would expect from the preceding discussion, secondary industry accounts for a higher proportion of all commodity production in the two central provinces than in other areas; the percentages in Ontario and Quebec were 57 and 48 respectively while for other provinces the figures ranged from 31% in Manitoba to 8% in Newfoundland. However, as the nature of production in Canada's various economic regions are described in the Commission's study *Some Regional Aspects of Canada's Economic Development*, this subject will not be pursued in detail here. It might be noted, however, that lower labour costs, the development of special skills, the growth of regional industries, as well as a number of historical factors have contributed to the existence of a limited range of manufacturing activity in the Maritime Provinces. The production of chocolates and confectionery, shoes, textiles, stoves, and of course, boatbuilding are examples that come to mind. In addition to the usual secondary industries of a local nature, primary iron and steel, shipbuilding, and railway equipment is important to this region. In Manitoba clothing and textiles are important industries, owing their establishment largely to the regional market for farm clothing. Winnipeg's importance as a railroad centre has also led to the development of a significant transportation equipment industry. In Saskatchewan and Alberta, petroleum refining is the most important secondary industry and accounts for about 30% and 20% respectively of net secondary manufacturing production in these two provinces. In British Columbia iron and steel products comprise the most significant single secondary group. This is due, among other reasons, to the added protection from eastern competition conferred by distance, the importance of structural steel and bridge building, and the production of certain regional specialties like power saws. Shipbuilding for both regional and national markets is also significant, and accounted for 10% of the province's secondary industry in 1953.

Capital Investment

We now turn to the capital expenditures of secondary industry. As shown in Table 28, secondary manufacturing in 1955 accounted for somewhat under 10% of the total fixed capital expenditures (i.e. excluding inventories) or considerably less than the 20% which it contributed to national output and employment. Its share of new investment has varied considerably from year to year but no clear-cut trend is discernible. In comparison, the resource and primary manufacturing industries, including gas and oil pipe lines, account directly for over a fifth of all investment although their contribution to total output is not much more than 10%. In brief, secondary manufacturing is less capital-intensive and more labour-intensive than the primary industries in that it uses fewer units of capital and more units of labour to obtain a given amount of output. This conclusion is substantiated by figures given in *Output, Labour and Capital in the Canadian Economy* where it is estimated that in 1955 capital investment per worker was \$24,400 in the resource industries, \$12,275 in primary manufacturing and \$6,875 in secondary manufacturing. In the service industries, which are not easily mechanized, the figure was only some \$2,450.

Since investment data for secondary manufacturing alone are not available prior to 1948, the period is too short to permit confident assertions about investment trends in this sector. There is, however, some evidence that in this very short period the relationship of investment to output has been rising. Thus, for the four years 1948-51 new capital expenditures amounted to 4.2% of gross output as against 4.9% in 1952-55. After allowing for any distortive effects of investment associated with defence projects, these figures would seem to indicate a relatively increasing use of capital in the domestic manufacturing sector. This is similar to the experience of many other sectors of the economy. In 1956, secondary manufacturing investment, particularly in iron and steel and electrical products, showed a further sharp increase.

It is not proposed here to analyze in detail the many and complex determinants of investment in the secondary manufacturing sector. Of overriding importance, of course, has been the judgment and confidence of individual businessmen as to the profitability of capital expenditures. This in turn has been linked to the past and anticipated growth of their markets and their ability to compete for the resulting demand on a sound cost basis. Other factors than the rate of growth of output have affected investment, however, including the degree of utilization of capacity and the age and obsolescence of plant and equipment. Also of great importance have been the increasing flow of technological innovations, the development of new products and processes, the need to reduce labour costs, and shifts in the composition of output towards products which require the use of more capital-intensive techniques. Investment has also been affected by variations

in the available supply of money, machinery and materials, either due to general economic conditions or to changes in the profitability and financial position of the individual firm or industry.

The investment pattern of individual secondary industries is shown in Table 29. Despite the marked upward trend in the totals for the last eight years, high levels of confidence about longer-term prospects, and an increasing tendency for businessmen to take a long-range view of their investment programmes, it is clear from the table that short-term business fluctuations affect the investment of individual industries from year to year. It should also be emphasized, however, that the investment programmes of many industries involve the expenditure of large sums of money and bring about relatively large increases in capacity. In view of the "lumpiness" of this process, investment cannot grow evenly from one year to another quite apart from variations in business confidence. This is particularly true of such capital-intensive projects as the building of a new oil refinery or a large automobile assembly plant. It is also true of the primary iron and steel industry in which investment fell to one-third of its 1948 level in 1950 reflecting the completion of the first wave of postwar expansion. Following Korea, investment rose more than ten times to its peak in 1952, fell to less than half this level in the 1954 recession, and has swung upward sharply again in the third round of postwar expansion in 1956 and 1957. This is perhaps an extreme example, but similar variations have occurred in the aircraft, motor vehicle and railway rolling stock industries. Swings in capital outlays are much less pronounced in the non-durable consumer goods industries like textiles and bakery products where demand is less volatile and the production unit is considerably smaller. It should be noted that fluctuations in investment which have been due to sharp changes in short-run business confidence have added somewhat to the costs of capital programmes because such changes have tended to cause investment outlays to be concentrated in boom periods when prices were rising.

It will be seen from Table 30 that nearly one-fifth of total secondary manufacturing investment in 1955, compared to less than 10% in 1949, was attributable to the petroleum products industry. This illustrates how the rapid growth of a highly capital-intensive and technologically advanced industry has altered the composition of output, or product mix, of secondary industry and hence the relationship of investment to output in the sector as a whole. The impact of this one industry can be judged from our estimate that its new investment in real terms has been equal to nearly 60% of its Gross Domestic Product for the eight years from 1948 to 1955; for secondary manufacturing as a whole the figure was about 10%. The relatively rapid rise of the capital-intensive primary iron and steel and motor vehicles industries, and the high rate of obsolescence and new product development in those industries, has also contributed to the growth in secondary manufacturing investment relative to output. The proportionate decline in invest-

ment and output in the more labour-intensive bakery, leather, clothing and textile industries has contributed to the increase in the investment-output ratio in a somewhat different way.

Within nearly all industries, shifts away from handicraft types of production towards more mechanized output have taken place. This is perhaps most obvious in the secondary food processing industries but it is also clearly true, for example, of textiles. Synthetic fabrics account for about one-third of textile production compared to less than 10% in 1939, and as production of these fabrics requires relatively large amounts of capital, they account for an even larger proportion of new textile investment than of production. The textile industry, particularly the cotton and woollen sections, also provides an example of how a contracting market, intensified competition, relatively unprofitable operations, and depleted financial resources can combine increasingly to affect both the ability and the desire to invest. Of course the difficulty of mechanizing certain operations in this and other labour-intensive industries, to be referred to later, has also been a factor of considerable importance. Investment in the railway rolling stock and agricultural implements industries in recent years has reflected the effects of more or less prolonged periods of excess capacity. The pattern of outlays in the aircraft and shipbuilding industries also reflects the existence of unused plant facilities as a result of variations in defence orders.

The foregoing are only examples of a few of the factors which must be kept in mind when reviewing investment expenditures in individual secondary industries or in the sector as a whole. While we have not attempted any detailed analysis of these factors, it is clear, nevertheless, that prosperity, full employment, and high levels of business confidence have in the past decade contributed to a widespread increase in the proportion of investment to output in the secondary industry sector. This development has been reinforced by a growing awareness of the benefits, indeed the necessity, of increasing investment in order to control costs and to increase productivity in an age of rapidly developing technology. It has also reflected the relative growth of the more capital-intensive industries within the secondary manufacturing sector. As we will suggest later, those industries or segments of industries which have been unable or unwilling to continue mechanizing their operations have found it increasingly difficult to compete for scarce resources with those expanding secondary and other industries which have been successful in applying larger amounts of capital to their production processes.

Imports²

We have noted that the growth of Canadian secondary industry has occurred in the face of substantial import competition, and that imports

²More extensive description and analysis of past and prospective trends in the nation's imports will be found in the study prepared for the Commission, *Canada's Imports*.

have always supplied an appreciable share of the domestic market for manufactured goods. Essentially, these imports reflect the relatively higher costs of manufacturing in Canada. More detailed analysis of the import competition facing individual industries and products will be provided in later chapters when the main factors affecting the costs of domestic manufacturing production are discussed.

This section will be concerned primarily with a discussion of the broad economic reasons for the volume and general pattern of Canadian imports of manufactured goods and for changes in the level and the source of these imports.

It must be emphasized initially that the competitive pressure of imports has been tempered throughout our history by the tariff and other instruments of national policy. Tariff rates vary widely from industry to industry and from product to product. Although there are numerous references to individual tariffs in the discussion of the cost and competitive position of Canadian industries, we did not attempt to undertake a comprehensive description or analysis of the tariff as this subject is fully dealt with in a special Commission study.³ However, the principal rates which apply to products of Canadian secondary industry are summarized in Table 31, drawn from this latter study. It is sufficient to note here, as an indication of the general level of tariff protection provided for Canadian secondary industry, that most of the significant rates lie between 10% and 25%, although there are a number of end-use items and goods of a class or kind not made in Canada on which rates are free or low. Variations in protection arising from such other factors as dumping, government purchasing policy, and administrative regulations are also noted in the present study where relevant, but are discussed in more detail in other Commission publications.⁴

It is difficult to estimate the exact share of the domestic market for products of secondary manufacturing which is served by imports. In 1953, a little over three-quarters of total Canadian imports, or some \$3,350 million, was classified in the trade statistics as fully or chiefly manufactured. Despite the difficulties of reconciling these trade figures exactly with the classification system used for domestic production, Table 32 indicates that something over \$2,900 million of these manufacturers could be classed as secondary industry production with the balance classifiable as products of primary manufacturing. This total of course overstates the volume of imports which is directly competitive with domestic manufacturing, as a considerable proportion of these goods are materials or components not made in Canada. Sizable imports of final products, such as some types of industrial machinery and most higher-priced automobiles, are also not made in Canada. In effect, some hundreds of millions of dollars of secondary

³See *Canadian Commercial Policy*.

⁴See, for example, *Canadian Commercial Policy, Canada's Imports and Canada-United States Economic Relations*.

manufactured imports complement, rather than compete with, Canadian manufacturing production.

On the other hand, the trade figures tend to understate imports of competitive goods insofar as these goods, like all imports, are valued f.o.b. their point of shipment in the country of origin. This is usually considerably below their duty paid laid-down price in the Canadian market, and therefore understates the dollar share of the final market which they obtain. There is no precise way of adjusting the figures for this under-valuation and for the complementary nature of many secondary industry imports. It is reasonable to assume, however, that the net effect of these two factors brings the total of competitive imports down well below the unadjusted median figure of \$2,925 million shown in Table 25, even when valued at wholesale selling prices in Canada. We estimate that the share of the domestic disappearance of all secondary manufacturing output (the gross value of production plus imports minus exports) which is obtained by competitive imports is probably not more than 18% and may well be lower. In comparison, the unadjusted figure yields a domestic disappearance ratio of almost exactly 20%.

As is noted in the Commission's import study, this comparatively high volume of manufactured imports is essentially a reflection of the specialized and open nature of the Canadian economy, as modified by the tariff and other protective factors. In this setting, individual businessmen and other groups in the private sector find it most profitable to devote their resources to the production and export of certain items and to import others. That it is more advantageous to import certain goods than to produce them in Canada is, of course, due to the comparative cost advantages involved in specializing on the things we do best and in buying our requirements with the proceeds. In short, we import many of the goods which we are capable of producing because it is cheaper to do so. This is true because Canada's relative abundance of certain types of valuable resources makes her a comparatively efficient and low-cost producer of a number of resource and primary products. This, in conjunction with our relatively small domestic market, makes many secondary manufacturing operations relatively more costly in Canada. The percentage of our net national production accounted for by secondary industry, at just over a fifth, is therefore considerably less than in the United States where it appears to be around 26-27%, or than in West Germany or England where the percentage is even higher. It follows that the percentage of imports to domestic production in secondary manufacturing will be generally higher than in these other countries.

A second broad factor which affects the level of imports in the secondary manufacturing sector is our geographical location and our way of life. Our proximity to the United States, the similarity of American and Canadian tastes, common advertising in the two countries, the standardization of production techniques, and the familiarity of Canadian engineers and technical

men with United States machinery specifications and performance have combined to develop a large flow of trade between the two countries. Also contributing to these imports have been the close personal, tourist, and business links between the two nations as well as the fact that many Canadian localities are geographically closer to United States regional suppliers than they are to Canadian producers, who are usually to be found concentrated in central Canada. All these factors have led to a unique type of North American interdependence which would doubtless continue to make its presence strongly felt in almost any conceivable set of circumstances.

The effect of these economic links between the United States and Canada on imports can be seen very clearly in the many parent-subsidiary relationships between American and Canadian secondary industry. Imports from American parent companies and their suppliers are substantial. This reflects the fact that many types of goods, especially complex parts used in the manufacture of the same product in the United States, are either not available in Canada or are available only at much higher cost. However, many Canadian branch plants appear to make a deliberate effort to buy in Canada if this can be done on a competitive basis. A number of companies have attempted to develop Canadian sources of supply, even though prices may be somewhat higher, because of such considerations as customer and public relations, and the need for equipment suitable to Canadian conditions. On the other hand, the Commission's study on *Canada-United States Economic Relations* indicates that there are cases where the parent channels the subsidiary's requirements to itself and to its own suppliers. In our judgment the branch-plant relationship probably causes imports to be somewhat higher than otherwise would be the case, although by far the greater part of these imports is the result of straight cost and price considerations and makes available goods and components at lower prices than if they were produced in Canada.

A third broad factor affecting imports of secondary industry products is the level and type of Canadian economic activity. When Canadian economic activity is very high and our rate of growth and investment is outpacing domestic savings, as in 1956, demand tends to spill over into imports, particularly from the United States. Such periods of rapid growth have characteristically been associated with high levels of investment and exports, a conjuncture which attracts large inflows of non-resident capital. These inflows help to finance high levels of imports of secondary manufactures and may in many cases be directly responsible for increased purchases of investment goods not readily available in Canada. Similarly, in less prosperous times imports and capital inflows tend to fall somewhat more rapidly than domestic production, thus cushioning the adjustment required in Canada as a whole and secondary industry in particular. As has already been noted, this was true, quite apart from the effects of tariff changes, in the depression of the 1930's, to a lesser extent in the recession of 1954, and in other com-

parable periods throughout our history. In short, imports of many manufactured goods constitute a marginal source of supply, drawn upon heavily when Canadian production is running at capacity and falling off when domestic activity declines.

That this import adjustment works as it does is due not only to changing levels of economic activity in Canada but also to shifts in the composition of Canadian output which accompany these changes. Machinery, equipment, and other investment goods such as primary iron and steel, trucks and comparable products accounted in 1953 for not far short of one-half of all secondary manufactured imports. When a decline in Canadian activity occurs, domestic investment tends to fall rather more sharply. Because business investment has a higher than average import content and also because investment goods are so important in total imports, these imports tend to fall faster than secondary industry production generally. Similarly, about one-sixth of total secondary manufactured imports is now made up of consumer durables such as automobiles, furniture, electrical appliances, and their components, all of which are very responsive to changes in the level of Canadian personal income and expenditure.⁵ Moreover, downturns in the nation's economic activity also tend to bring about a decline in the foreign exchange rate which raises the Canadian dollar price of imports. They also lead to some increase in competition between Canadian producers which puts pressure on domestic prices. Canadian manufacturers thus gain a larger share of the market when the economy is less buoyant. This substitutability between local production and imports has usually meant that a large part of the fluctuations in domestic inventories has spilled over into imports, with the imports falling during an inventory run-off and rising in times of inventory accumulation. This characteristic of imports has been the principal reason why expanding imports are not inconsistent with the rapid growth of such Canadian industries as primary iron and steel, electrical apparatus, and chemicals. However, the desire of Canadian purchasers to maintain contact with foreign suppliers in order to be assured of reasonable treatment in periods of shortage may to some extent cause imports to be higher in periods of easy supply conditions in Canada than would otherwise be the case.

Movements in the total of secondary manufactured imports over the past 25 years have reflected these three broad influences—specialization, links with the United States, and variations in the level of Canadian activity. In attempting to make a long-run comparison, however, allowance has to be made for the distortive effects of the depression, war, and immediate postwar years. It is for these reasons that we follow the pattern of the Commission's import study in believing that the most meaningful long-run comparison which can be made of secondary industry imports is that of 1929 with 1953; the latter year was chosen in the absence of final and complete data for 1955.

⁵See Appendix to Chapter 2 of *Canada's Imports*, for a discussion of the end-use classification of Canadian imports.

Such a comparison should yield reasonably valid results since both 1929 and 1953 were years of high activity in Canada and since both were relatively free of any marked short-term distortive influences. The unadjusted import figure of about \$750 million shown in Table 25 suggests that the import/domestic disappearance ratio was some 23% in 1929 compared to 20% in 1953, a noticeable if not spectacular decline of some 10% to 15% in the intervening two and a half decades. The results naturally vary widely from industry to industry and from one product to another. It is also interesting to note that an attempt to adjust for the effects of import valuations and non-competing imports in the two years yields much the same results.

In the severe depression of the 1930's, the ratio of imports to domestic disappearance was abnormally low due to the low level of economic activity and the extreme decline in capital investment in Canada. This particularly affected imports of machinery and consumer durables. Protection to manufacturing was also increased significantly due to changes in tariff rates, to the effect of specific duties in a time of falling prices, and, as already noted, to a very substantial increase in administrative restrictions. As a result of these developments all secondary manufactured imports accounted for only 16% of total consumption in 1937, and the figure was lower at the depth of the depression. However, across a broad range of manufacturing, as is shown in the import study, the import share was even smaller in 1948 and 1949 than it had been in 1937. This was, of course, due in part to the imposition by Canada of exchange and trade controls as well as to the short supply of imports from Europe because of postwar reconstruction needs. In addition, prior to the devaluations of 1949, European exchange rates were artificially high and did not reflect the relative inflation and loss of competitive power which those economies had suffered.

The combined effect of European recovery, of the freeing of the Canadian exchange rate from its devalued 1949 level, (in 1953 it averaged some 3% to 4% higher than in 1929), and of the abolition of import restrictions all worked to remove a series of abnormal limitations on Canadian imports. Much of the increase in Canadian imports in the last few years has been the result of a re-establishment of a normal competitive import relationship. Comparisons of the import share of domestic manufacturing in the early postwar years with more recent periods do not therefore provide a satisfactory or fair guide to the long-run competitive position of these industries in that "what is being compared is a period during which imports were abnormally low with one in which imports were more or less normal for a rapidly growing . . . Canadian economy."⁶ The import ratio in 1956 appeared to be close to its 1929 level but this appears to have reflected the abnormal strain on Canadian capacity rather than any fundamental deterioration in the Canadian competitive position. The long-run decline in import shares from 1929

to 1953, while small, occurred in spite of a small adverse movement in the exchange rate and a long-run decline in tariff protection. It has, therefore, been more than wholly attributable to a basic improvement in the relative costs of Canadian domestic manufacturing production.

The composition of secondary manufactured imports by broad industrial groups is also shown in Table 32. As already indicated, close to two-thirds of these are accounted for by machinery and equipment, investment goods, and consumer durables, in many of which foreign producers have significant cost advantages. In fact, a number of these items are simply not made in Canada because the market is not large enough to justify setting up production; the automobile, electric apparatus, machinery, electronics, and iron and steel industries provide examples. For instance, a wide flange mill producing structural steel beams requires a minimum output of some 550,000 tons annually to be reasonably economic while the whole Canadian market absorbs only 160,000 tons in the present period of high construction activity. Agricultural implement imports are a rather special case. With free trade between Canada and the United States in these products, our producers tend to specialize in the production of self-propelled combines and certain other items while depending almost exclusively on imports of tractors, which accounted for some 60% of farm machinery imports in 1953. In the consumer soft goods field, imports of textiles and clothing, mainly the former, were the most significant group in 1953, accounting for just under 10% of all secondary industry imports. It can be seen, however, that the importance of textile imports to secondary manufacturing imports as a whole has declined since 1929, due mainly to the decline in the importance of the industry's production relative to that of the sector as a whole. On the other hand, the decline in the relative importance of primary iron and steel imports reflects the improvement in the competitive position of this industry and the increasing variety of products made in Canada. This is also true of the decline in imports of alcoholic beverages, although special factors connected with United States prohibition had some influence on 1929 imports. Industries in which imports have expanded in importance relative to those of the sector as a whole include aircraft, farm implements, and almost all classes of non-agricultural machinery, the latter reflecting the increased ratio of machinery and equipment to national production.

The main sources of some of Canada's principal secondary industry imports are set out in Table 33. It can be seen that nearly 90% of the three machinery items came from the United States in 1953, while this was true also of the two main groups containing consumer durables items, namely motor vehicles and electrical apparatus. Indeed, this ratio applies to all secondary industry imports; the United States share of this latter total was some 83% in 1953 compared to 74% in 1929; the United States share of all Canadian imports in 1953 was just under three-quarters. While the increas-

ingly close relations of the two countries has been a factor, the main reason is that the United States has strengthened its position as the world's most efficient producer of manufactured goods, particularly of such mass-produced items as machinery and consumer durables. United Kingdom imports made up a significant proportion only of specialty items like Scotch whisky or of commodities embodying large quantities of labour such as woollen textiles. Imports from other countries did not exceed 15% of the total for any major group shown on the table and were important only in specialty or high-labour-content items.

More detailed reference will be made to this question of overseas imports in Chapter 5 but it might be noted that the percentage of imported manufactures originating in the United Kingdom and other countries has fallen from 19.7% and 6.4% respectively in 1929 to 12.2% and 4.6% in 1953. These figures refer only to the sample set out in the table but as this covers over 80% of secondary manufactured imports in both years, there is no reason to think that the results would differ markedly for the sector total as a whole. The decline in the British share of imports has been due to a fall in the United Kingdom share of imports of particular goods such as alcoholic beverages, rubber products, and cotton textiles. It has also been due to the declining importance of their traditional exports to Canada relative to Canadian imports as a whole. Offsetting this to some extent has been a slightly rising United Kingdom share of some increasingly important Canadian imports such as non-farm machinery and electrical apparatus. Since the United Kingdom share of our imports rose to about a quarter in the depression, the decline in the last 20 years has been more pronounced than comparisons with 1929 would indicate. Among the reasons for the increase in the United Kingdom share of imports in the early '30's were the large increase in imperial preferences (later reduced considerably), the comparative cheapness of sterling in that period, and the fact that the United Kingdom share of soft goods imports such as leather footwear, paints, and textiles, which suffered relatively small decreases in demand, was above the average British share of all secondary imports.

The import share of the domestic market for individual products differs widely, even within a single industry, as a glance at Table 34 will show. This table attempts to measure the import proportion of domestic disappearance for a representative sample of products, in terms of either value or volume data, by matching as closely as possible the import classifications with the equivalent category of domestic production. Included in the import figure are components and parts as well as products which, while not made in Canada, would be assigned to the industry in question if in fact they were produced here. For the sample as a whole, these inclusions would appear to inflate the competing import figures by more than the import valuation methods noted earlier understate them; but this nonetheless appeared to be the most prac-

tical and realistic method of calculation. Excluded, of course, are such inputs as coal, raw cotton, and other unmanufactured materials. When allowance is made for variations in tariff protection, the import shares of individual products broadly reflect the competitive position of the Canadian industry manufacturing the product or products concerned. Similarly, sizable changes in the import share of markets for each product from one period to another, after taking account of changes in protection and any other special factors, tend to illustrate changes in the comparative cost position of our secondary industries.

We have attempted in this section to sketch in some of the broad factors which affect Canadian imports of secondary manufacturing production. As already indicated in Chapter 2, import competition has undoubtedly affected prices and profits of Canadian manufacturers and has limited the growth of some of our higher-cost industries. It is also true that the existence of imports has broadened the range and intensity of competition in Canada and has enabled the economy to benefit from a relatively specialized pattern of national production. At the same time a measure of tariff protection has assisted in the development of a large domestic manufacturing industry. In confining ourselves to a description of imports, we have not attempted to enter into the perennial controversy about what level of imports, and thus what level of secondary industry, is desirable. A number of grounds on which this subject is debated were mentioned in Chapter 1. But if the appropriate level of imports is a matter of controversy, it is quite clear that the import share of the Canadian market for secondary industry as a whole has declined somewhat since 1929, reflecting the increased ability of domestic producers to compete with foreign production despite a small decrease in the protective effect of tariff barriers. The main exceptions have been those industries having a high labour content and using production processes which are not easily capable of mechanization. The reasons which lie behind these developments will be dealt with in more detail in the chapters which follow.

Part II

**COMPETITIVE POSITION OF CANADIAN
SECONDARY INDUSTRY**

SCALE OF OPERATIONS AND SPECIALIZATION OF PRODUCTION

The Small Size of the Canadian Market

We have emphasized in earlier chapters that the domestic market forms the principal outlet for the products of Canadian secondary industry; in recent years only about 6% of total output has been exported. This dependence on the home market has stemmed in part from decisions taken around the time of Confederation when the United States adopted a high tariff policy and when, partly in response to this action, Canadian tariffs on manufactured goods were raised as an instrument of national policy. This dependence on the domestic market has been accentuated in recent years, despite some reduction in U.S. tariffs, by the tendencies of most overseas countries to apply stringent trade and exchange restrictions on North American manufactured goods. These restraints, together with the still formidable barriers to entry to the United States market, have intensified the dependence of Canadian manufacturers on the relatively small Canadian market, and have prevented them from obtaining maximum economies from mass production and specialized operations. In these circumstances, it is appropriate that we should begin our analysis of the competitive position of Canadian secondary industry with a discussion of the effects of the size of our market on relative manufacturing costs in Canada. Certainly there was general agreement in the briefs submitted to the Commission, and in the testimony of industry witnesses at the hearings, that the disadvantage of producing for the much smaller Canadian market is a serious handicap for most Canadian manufacturers in competing with imports from the United States.

Although there may ultimately be limits to the advantages to be obtained from larger and more specialized production units, the continuing realization of greater and greater gains from mass production and specialization have, of course, been fundamental to the successful development of modern industry in the United States. These advantages stem from the fact that as volume rises, costs per unit of output tend to fall. This reduction in unit costs may come about because of a decline in existing overhead charges such as the

wages of office, warehouse and maintenance staffs, plant upkeep and depreciation, design, engineering, tooling and die costs and research and development expenditures. It may also come about because greater volumes of specialized production permit the substitution of capital for labour, through the use of high-speed, special-purpose, automatic machinery which cannot economically be adapted to short runs and a wide variety of uses. As one manufacturer put it at the hearings:

"In modern manufacture there are great advantages to . . . specialization. It makes possible the development of straightline, integrated manufacture, in plants specifically designed for the product, and with equipment that reflects the optimum in the use of power, automation and semi-automation. It makes possible lower labour costs per unit of product, and permits the manufacturer to concentrate the thinking, efforts and skills of his people on the one product or product line, without wastefully scattering their efforts or abilities over a larger area."¹

In summary, it is obvious that efficiency in manufacturing, no less than in other phases of our economic life, depends upon a division of labour which enables individuals and firms to concentrate their productive efforts on the things they do best.

It is also very obvious that the maximum advantages to be derived from increased volumes of output and greater specialization of production and skills are far from being realized in Canadian secondary industry at the present time. Of course, with the production of Canadian secondary manufacturing encompassing such disparate items as pins and locomotives, custom built machinery and mass-produced automobiles, it is evident that the economies which accrue from large-scale production and specialization vary widely from product to product. Indeed, any general conclusions about the overall effects of scale on secondary industry must be based on a consideration of its consequences for individual industries and products. While a broad general pattern also emerges, the analysis in this chapter will be based largely on evidence about individual industries drawn from the Commission's studies, from the briefs, and from the hearings.

No attempt is made in this chapter to make a detailed comparison of the size of markets and output in Canada and the overseas countries. Even if the data were readily available, the comparison would not be particularly relevant. In the first place the United States is a much more important source of competition for Canadian manufacturers than all other countries combined. Canada is part of an integrated North American economy, and our tastes, incomes, and productive techniques are much more like those in the United States than in any other part of the world. Moreover, only in relation to the United States can the Canadian market and Canadian manufacturing

industry be considered small; the Canadian market for manufactured goods is about half as large as that of the United Kingdom, the second most important western industrial power, and larger than those of Italy or Japan. It is not surprising that in products where these and other overseas countries are important competitors in the Canadian market any cost disadvantage of Canadian industry is ordinarily traceable to wage differentials, rather than to the handicap of a smaller market and shorter production runs. There are some exceptions to this, of course, and where they appear to be significant they will be referred to in the text.

In view of the general lack of reliable and comprehensive data on markets for products of secondary industry in the United States and Canada, we have been compelled to rely largely on comparative output data. However, if allowance is made for the imports and exports of both countries the data on production may be used as a measure of markets. In Canada production figures understate the relative size of the Canadian market by about 10% to 15%, or the amount of the net import balance of Canadian secondary industry as a whole; for individual industries the difference between output and markets is sometimes larger, depending on export markets and import competition. In the United States, production figures overstate slightly the size of the domestic market in that there is an export balance in this sector; however it is small in relation to domestic sales. While an attempt is made in the discussion of the position of individual industries to adjust the output figures for this factor, it should be emphasized that the effective figure for purposes of evaluating the handicap of scale is the relative volume of production in the two countries.

Some figures of comparative output in Canada and the United States are given in Tables E and F. Table E lists 1953 employment and value added for most of the secondary industries. Table F provides comparative output data for some of the more important or representative products manufactured by secondary industries in the United States and Canada. The over-all statistics indicate that in dollar terms the production of American secondary industry is 18 times that of Canada. Actually in terms of physical output, the difference is somewhat greater than this 18 to 1 ratio; the concept of value added used in the United States production statistics is more "net" of inputs bought from other industries than its Canadian counterpart, and American prices of manufactured goods are somewhat lower than Canadian prices, probably by more than 10%.² The effect of these adjustments would be to bring the ratio of real output up to a level of 21 or 22 to 1. On the other hand, the adjustment for imports referred to in the foregoing would mean that the ratio of domestic disappearance in physical terms is of the order of 18 or 19 to 1. It will also be noted that the relative employment ratio is about 14.5 to 1, reflecting the much higher level of output per man in American secondary industry.

²See detailed reference to this price differential in Commission study *Canadian Commercial Policy*.

Table E

COMPARISON OF SELECTED SECONDARY MANUFACTURING INDUSTRIES IN CANADA AND UNITED STATES

EMPLOYMENT AND VALUE-ADDED 1953

	Employment		Value-Added		
	Canada (production workers)	United States as multiple of Canadian	Canada (Canadian \$)	United States (U.S. \$)	United States as multiple of Canadian
	(thousands)		(millions of current dollars)		
Bakery products.....	34.7	182.6	5.3	\$1,929	10.7
Beverages.....	16.6	126.8	7.6	2,378	8.0
Tobacco products.....	8.2	87.2	10.6	75	13.2
Rubber products.....	17.0	218.9	12.9	2,021	11.7
Leather products.....	28.8	338.4	11.8	1,711	16.5
Textile products (ex. clothing).....	61.7	882.2	14.3	5,007	16.7
Clothing.....	104.4	1,337.3	12.8	415	15.7
Furniture.....	24.7	309.9	12.5	2,047	16.8
Printing, publishing.....	38.7	474.0	12.2	5,916	16.3
Agricultural implements.....	11.0	62.7	5.7	582	7.3
Industrial machinery.....	16.9	931.0	55.1	9,788	62.3
Primary iron and steel.....	30.5	530.3	17.4	5,548	25.6
Motor vehicles and parts.....	46.3	683.8	14.8	6,938	16.7
Railway rolling stock.....	32.9	60.2	1.8	552	3.6
Shipbuilding.....	20.1	120.7	6.0	803	6.9
Aircraft and parts.....	27.1	600.8	22.1	5,764	22.1
Electrical apparatus and supplies.....	54.8	967.5	17.7	8,957	19.6
Products of petroleum and coal.....	11.5	175.8	15.3	2,795	13.2
All other secondary.....	238.1	3,873.9	16.3	\$ 37,578	20.0
Total secondary manufacturing.....	824.0	11,964.0	14.5	\$107,829	18.0

SOURCE: United States Data—Census of Manufactures converted where possible to S.I.C. basis used by D.B.S. Canadian Data—D.B.S. Census of Industry.

NOTES: For reasons which are summarized below, these figures should be used with caution in attempting to compare United States and Canadian production. However, they do provide some indication of the rather wide variations in relative size between industries.

1. The industry groupings for each country are not necessarily identical.
2. Value-added is a somewhat more "net" concept in the United States statistics and understates by an average of some 10% the relative value of United States production.
3. The fact that United States prices of secondary industry products are more than 10% lower also tends to understate the relative value of United States production.
4. Different exchange units are used, the United States and Canadian dollars.

Table F

COMPARATIVE PRODUCTION OF SELECTED PRODUCTS,
UNITED STATES AND CANADA, VARYING DATES

Product	Unit	Year	Production		United States as multiple of Canadian
			United States	Canada	
Beer	(million bbls.)	1954	88.8	8.4	10.6
Cigarettes	(billions)	1954	402	22.1	18.2
Rubber tires	(millions)	1954	89.2	6.2	14.5
Gasoline	(million bbls.)	1954	1,270	69.6	18.2
Broadwoven cotton cloth	(million yards)	1954	9,764	264	37.0
Primary steel ingot (total)	(million tons)	1955	116.50	5.22	22.3
Steel plates	"	1953	9.03	.22	40.7
Tinplate	"	1953	4.85	.24	20.3
Structural steel	"	1953	5.99	.20	29.6
Galvanized sheet	"	1953	2.33	.11	21.4
Automobiles	(thousands)	1954	5,560	318	17.5
Trucks	"	1953	1,202	121.1	9.9
Refrigerators	"	1954	3,425	230	14.9
Washing machines (automatic)	"	1954	2,420	28	86.4
Washing machines (wringer)	"	1954	1,230	192	6.4
Vacuum cleaners	"	1954	2,782	116	24.0
Floor polishers	"	1954	325	130	2.5
Electric ranges	"	1954	1,165	168	6.9
Home freezers	"	1954	975	8	121.9
Clothes dryers	"	1954	656	21	31.2
Television sets	"	1954	7,300	611	11.9
Radios	"	1954	6,415	488	13.1
Gypsum wallboard	(million sq. ft.)	1954	12,564	263	47.8
Building brick	(millions)	1954	6,154	460	13.4
Structural tile	(thousand tons)	1954	954	186	5.1

SOURCES: D.B.S.: *Canadian Statistical Review*.
 United States *Annual Survey of Manufactures*.
Survey of Current Business.
 Commission studies *Canadian Electrical Manufacturing Industry* and
Primary Iron and Steel Industry.

To avoid confusion about these comparative United States and Canadian figures, and to contrast them with other relevant statistics, the following brief table is provided:

Table G

	United States	Canada	Ratio U.S. to Canada
Population (millions) 1955	165.3	15.6	10.6 : 1
Gross National Product (\$ billion) 1955	\$ 390.9	\$ 26.8	14.6 : 1
Production workers in secondary industry (thousands) 1953	11,964	824	14.5 : 1
Value added—secondary industry (\$ billion) 1953	\$ 107.8	\$ 6.0	18 : 1
Physical output—secondary industry (approximation)	—	—	21 or 22 : 1
Market for secondary industry products (approximation)	—	—	18 or 19 : 1

It is fairly obvious that the relative demand for many products diverges widely from the rough 18 to 1 difference in market size. It would be surprising if this were not the case; in spite of superficial similarities the structures of the two economies are appreciably different, and these differences tend to be reflected in the demand for and production of secondary industry products. The importance of the primary export industries in Canada, for example, has led to a relatively large domestic demand for such products as pulp and paper machinery, paper mill felts and mining machinery, and Canadian manufacturers have tended to specialize in these products. The extensive development of the Canadian railway system, in response to the need to transport wheat and other bulky primary materials over long distances, has contributed to the growth of a railway rolling stock industry nearly one-third as large as that in the United States. On the other hand, the fact that the United States production of industrial machinery is 62 times as large as the Canadian reflects the greater development of more complex manufacturing processes in the United States, which only a very large and industrialized economy can support. The market differential, although above average, is much smaller than the production difference, due to the large imports of machinery that cannot be manufactured economically in Canada; much the same considerations apply to sections of the primary iron and steel industry.

The relative demand for manufactures in the two countries is also affected by differences in income, tastes, and consumption habits. The United States demand for automobiles, in particular of the higher priced variety, is considerably greater in relation to income than the demand in Canada, reflecting both the high elasticity of demand relative to income and the more important place the automobile appears to hold in the American scale of values. The same is true of many other consumer durables, particularly the newer products such as home freezers and automatic washing machines. The much higher rate of expenditure on research and development in the United States produces a steady flow of innovations in that country, and this, coupled with higher United States incomes and more ready acceptance of new and more expensive products, causes American consumption to be relatively much higher than in Canada. Initially the proportionately small Canadian demand is supplied by United States producers, but when the product is better established, and Canadian demand is large enough to make possible a reasonably efficient manufacturing operation, Canadian production expands rapidly and the gap in output is reduced to more normal levels. A recent important example of this was the rapid growth in the Canadian production of television receivers between 1954 and 1956; currently the ratio of Canadian output to that of the United States is about 1 to 12, which, due to the lag in the introduction of television into this country, is somewhat above average.

There are a few products where the process has worked the other way, with development occurring in Canada in response to special demand in the Canadian market. Among the electrical goods, floor polishers and electric kettles, and in the agricultural machinery industry, self-propelled combines, are examples of this. In still other products lower Canadian incomes and differences in tastes have led to production being maintained at a high level while United States production declined. For example, in Canada the per capita market for standard wringer washers is relatively much greater than in the United States, so that the output ratio in 1954 was about 6 to 1 compared with 86 to 1 for automatic washers. The difference in incomes is probably the explanation of why the average Canadian drinks as much beer as an American, in contrast to a much lower per capita consumption of spirits. It probably also explains why Canadian cigarette consumption is only little more than half as great on a per capita basis, although Canadian use of tobacco for home-made cigarettes is relatively greater; it may well be, however, that differences in taxes on tobacco in the two countries have some effect on this comparison. The per capita consumption of textiles in Canada is about two-thirds that of the United States, or not very different from the disparity in incomes. In contrast, Canadian industries with substantial export sales generally have a higher than average output relative to that of the United States. Exports of some products such as rye whisky or self-propelled combines are in many years as large as or larger than sales on the domestic market. For other products such as synthetic rubber, trucks and typewriters, export sales may also account for a significant proportion of output, as is true also of products such as Hudson Bay blankets and ice skates which may be regarded as Canadian specialties.

Size of Market and Competitive Position

These wide variations between the size of the market in the United States and Canada for individual products of secondary industry are reflected in the competitive position of the industries concerned. As is pointed out in the Commission's import study, there appears to be a close correlation between relative size of markets and import shares; as the market difference widens the proportion of the Canadian market held by imports tends to rise. In the industrial machinery industry, for example, imports supply less than 20% of our pulp and paper machinery requirements, where our market is relatively large, and close to 100% of printing and textile machinery where our market is small relative to that of the United States. Similarly the Canadian market for locomotives and freight cars is relatively much larger than the normal United States—Canada market relationship, and imports into Canada are low. In the field of electric appliances the same pattern appears evident; in the example given above of the Canadian market for washing machines, the relatively high Canadian use of wringer type machines is matched by low imports, and the low demand for automatic machines by a

high import share of the existing market. In such appliances, however, as we have pointed out, growth in the Canadian market will normally lead to expanded production and a lower import share of market.

It must be emphasized, of course, that a relatively large market in Canada for any product does not of itself guarantee that the product can be manufactured in this country at a price competitive with imports. This may be due to the fact that the Canadian market is divided among a proportionately greater number of firms than in the United States or to the fact that the cost penalty for operating a plant at below minimum efficient size is larger. The size of this penalty naturally varies widely from industry to industry and product to product. Similarly there is considerable variation in the optimum size of production units in the United States depending on the nature of the product—its adaptability to mass-production techniques, the complexity of design and frequency of design changes, and the special equipment and the capital required for the production process.

Canadian disadvantages in secondary industry are normally at a maximum when the Canadian market as a whole is smaller than the output of an American plant of efficient size, and when the penalty of operating below capacity is great because the product is complex, or because its design is altered frequently. In brief, the disadvantages are greatest when capital and overhead cost are large and the volume of production available to amortize these costs is relatively small in Canada. An example of such a product is a deep-drawn body stamping for an automobile; here the Canadian cost disadvantages are very great, and it is not surprising that all our requirements are imported from the United States. For smaller and simpler products which can be produced by general purpose machinery the difference between the size of Canadian and United States plants is not always as large, scale of operations not as important, or the penalties of operating below optimum capacity not as severe. This is also true of a number of products like beer and a few building materials, output of which in both countries must be geared essentially to local or regional markets.

Excessive Division of the Canadian Market

Even where the Canadian market is large enough in total to make possible a few plants of close to optimum size, this concentration of production is seldom achieved. In fact, in a number of industries, particularly in the field of consumer durables, there are many more producers than would appear justified by the size of the market. One clear-cut if perhaps extreme example of this was cited by the president of Canadian General Electric, who said that in the production of electric refrigerators in the United States the minimum mass production facility that could be established would have an output of between 250,000 and 350,000 units per year; with additional investment of 20% to 30% the facility would be rounded out to near optimum size,

gaining a further reduction in unit costs and increasing the capacity to roughly 500,000 to 700,000 units annually. By contrast, the total Canadian output of refrigerators in 1955 was 267,000 units—produced by 19 manufacturers!³

Contributing to the excessive fragmentation of the Canadian market, particularly in the field of consumer durables, is the high proportion of Canadian companies which are subsidiaries of American firms. The parent manufactures a full line in the United States, and its management tends frequently to assume that the full line should also be produced in Canada. It also appears that many United States firms have entered Canada hoping to obtain an unrealistically large share of the market. The inrush of United States television manufacturers into Canada from 1952 to 1954 is an instance of this; by 1955 there were 21 manufacturers of television sets in Canada with an average output of 41,000 units, compared with 45 to 50 producers in the United States with an average output of 164,000 units. The American parent-Canadian subsidiary relationship is particularly marked, not only in the manufacture of electrical equipment, appliances and television receivers as noted above, but also in automobiles, rubber products and chemicals. In all these industries economies of scale and specialization tend to be substantial, but because the American industry structure has been carried over into the Canadian market, most of them are characterized by more diversified, less specialized and relatively less concentrated manufacturing plants than in the corresponding industries in the United States.

We have indicated that the market expectations of United States firms setting up subsidiaries in Canada have not always been realized. There is evidence that in spite of lack of profits, and even after repeated losses, many parent firms are unwilling to close down the Canadian subsidiary's operations. This reluctance may be due to hope that given new management or new products the tide will turn. Perhaps of even more significance is the loss of face for the company in the larger arena of American business if it does wind up its operations in Canada. As one spokesman for the electrical industry stated at the hearings, in referring to competition between the 19 manufacturers of refrigerators:

"I think it is accepted as a matter of pride and principle that they have to operate in Canada, and that is why you find so many over here . . . I don't think they will be eliminated from the Canadian market until they are eliminated from the American market".

One of his competitors, when asked about the obstacles to greater consolidation of production in the electrical equipment field, said:

". . . the impediments are the national structures of the companies that are in the field. Many of them are not in just this field alone.

³Hearings, Toronto, Feb. 1, 1956, pp. 5736, 5737; Company submission.

They feel there is a future in the business and perhaps they can afford to invest some money for a few years in it and establish and build to be one of the leaders".⁴

One hesitates to attribute irrational behaviour to the American businessman, and it may be that the reluctance to shut down a losing operation represents a more long-sighted view of the growth of the Canadian market than normally prevails. Yet as later discussion on profits shows, it does appear that in some secondary industries profits on investment or on sales are somewhat lower in Canada than in the United States, which is consistent with the conclusion that an American company tends to be more tolerant of losses by its Canadian subsidiary than if losses occurred in a branch plant in the United States. Why this should be so is difficult to see, unless it is that the closing of a branch plant in the United States is a simpler operation and involves no interruption in the flow of the firm's products to areas formerly served by the plant, while the Canadian tariff and other possible barriers to imports may mean that the closing of the Canadian plant would largely eliminate sales in Canada. Nevertheless, a number of Canadian subsidiaries have ceased operations; during the past year several prominent firms such as Motorola have given up manufacturing in Canada. Perhaps it will be possible to make a more fruitful appraisal of this question after a few more years of very competitive conditions in secondary industry.

Specialization of Production

The division of the Canadian market among a large number of firms is of course only one aspect of the problem faced by Canadian producers in trying to achieve maximum gains from scale and specialization. Equally important and closely related is the fact that the size of the American market permits a much greater degree of specialization in that country than is possible in Canada. As one executive of a building products company put it:

"Volume does not necessarily express itself in a large size plant (there is an economic limit to the size of a production unit); it may take the form of higher specialization. To illustrate the point, there is potentially as great a variety of tastes and quality requirements in a market of 15 million as there is in a market of ten times that size; but only in the larger market will the minority requirements be large enough to warrant economical production in specialized plants. Where an American plant manufactures a single type of brick, we have to produce five, six or more different colours, grades and finishes".⁵

It is undoubtedly true that in most secondary industries United States plants are considerably more specialized than Canadian. In comparing manufac-

⁴Hearings, Toronto, Feb. 1, 1956, pp. 5766, 5742, 5743.

⁵Hearings, Montreal, February 23, 1956, p. 7033.

turing plants in Canada and the United States one is struck not so much by the relatively greater size of the United States production units—although United States plants usually are somewhat larger—but by the fact that the Canadian plant in practically all cases produces a much greater variety of products for its size. The Hamilton plant of the Steel Company of Canada, for example, is as large as many efficient steel mills in the United States, but it produces many more products. One of our large rubber companies produces 600 different sizes of tires in one plant compared to a small fraction of that number in most United States plants while some Canadian wire and cable plants produce up to 1,000 kinds of wire.

It appears from these observations that Canadian secondary industry is a long way from achieving an industrial structure and production organization of maximum efficiency. During the past few years, of course, Canadian business has become much more competitive and there have been some signs of increasing concentration of production; there are now fewer Canadian manufacturers of television sets, electric ranges and refrigerators than there were several years ago, with some firms having either narrowed the range of their production, merged, withdrawn from business, or failed. This process has been going on simultaneously in the United States, where company mortality, particularly in the field of consumer durables, has been high. There is also evidence that growth of the Canadian market has by itself encouraged a trend towards greater specialization. The vice-president of Canadian Westinghouse commented on this:

“from my own company’s experience over the years we tended to concentrate all our production in one plant; years ago that was a good thing to do because we had one administration where production costs were small and we were able to pool a lot of our machinery and equipment. With the larger markets we are able to break away a lot of these types of items that we were building out of common facilities and put them into single purpose plants and we are finding that is one of the answers to our many problems.”⁶

It is surprising, however, in view of the substantial economies that could be obtained in most industries from further concentration and specialization, that Canadian industry has remained as diversified as it has. Of course, to some extent this diversification is the inevitable result of the decision to encourage a broader range of manufacturing production in this country than would have occurred in the absence of the tariff. Nevertheless, there are differences of opinion among economists and businessmen about the forces which have prevented the development of a more rational structure of production, and we have made some attempt in following paragraphs to outline briefly some of the hypotheses which have been put forward. In the first place, it is clear that diversification represents an attempt by Canadian pro-

⁶*Hearings*, Toronto, Feb. 1, 1956, p. 5766.

ducers to reduce the handicap of short runs in our relatively small and fragmented market. Given the background against which Canadian secondary industry has developed, it obviously makes sense for a manufacturer to try to keep down overhead costs by using the facilities of a plant for the manufacture of more than one product. This was referred to at the hearings:

"... the tendency is to try to build a full line of major appliances in the one factory and by utilizing these major facilities, by changing tools and combining operations approach an efficient operation which you might have if you had a large factory producing a single appliance . . ."⁷

Greater specialization in Canada is also impeded by the far reaching effects of advertising on product differentiation. Canadian buyers, like their American counterparts, have brand preferences for stoves, refrigerators, or automobiles. Indeed, since the Canadian consumer is exposed to a great deal of American advertising, he usually expects the same degree of choice to be available in Canada as in the United States. In this type of market it is difficult to believe that competition would lead to the complete domination of the market by one or two producers when customers will perhaps pay a little more for the privilege of purchasing their favourite brand. However, in view of increasing price competition in almost all consumer durable industries, it is quite conceivable that a few producers would capture such a large share of the market that the others would either abandon the market entirely or attempt to maintain at least a part of their sales in Canada by importing from the parent company over the tariff. Of course, in varying degrees this rounding out of Canadian production by imports does in fact take place at the present time.

It is also argued frequently that in a number of industries, where goods are distributed directly from the manufacturer to the large retailers and retail chains as well as to wholesalers, the manufacturer must carry a complete range of products. Thus he feels compelled to manufacture a number of items which he cannot produce efficiently and which require a greater diversification of production than is desirable. In some instances this is done because the manufacturer is afraid that greater specialization would not provide him with enough volume of output to keep down overhead and selling costs. As already indicated, there may be economic reasons for diversification in some industries, but this does not by any means apply to all. The Commission's study of the primary textiles industry comments on this issue as follows:

"The combination of exacting and highly diversified demands in terms of quality and limited demand in terms of quantity poses the dilemma. On the one hand, Canadian producers feel they must do what they can to satisfy their customers, or forfeit the business. This objective necessitates production in wide variety. On the other hand

their output and over-all scale of operations are much smaller than those of their American competitors. This condition involves much shorter production runs and denies them comparable economies of mass production. Among members of the industry in Canada we found common apprehensions that inability to supply a given item or range of items may cause a customer, particularly a large customer having a wide variety of demands, to take his business elsewhere. Further, we were told that lack of domestic supply in a certain commodity or line may open the door to duty-free status for foreign imports, leading to irrevocable loss of business. We thus encountered a general belief that the Canadian industry must continue to produce a wide range of products, notwithstanding the resulting higher costs, as the alternative to loss of markets."⁸

A sales executive of one of the largest wire and cable companies in Canada stated that his company sold directly to small contractors as well as to wholesalers and retail outlets. However, they had found that small orders, requiring very frequent machinery changes, were becoming expensive to handle, and steps had been taken recently by the company to add an extra charge for orders below a certain minimum figure.

The examples quoted, as well as similar instances in other industries such as iron and steel products, suggest that the Canadian system of distribution of many secondary industry products is a deterrent to increased specialization. This, of course, is unrelated to the existence of American branch plants and is simply another aspect of the smaller size of the Canadian market. The volume of business in Canada may not be large enough to support the type of wholesaling structure which exists in the United States, where the wholesaler builds up a line by buying from many specialized manufacturers. On the other hand, it is suggested by some that it is the lack of specialization among Canadian manufacturers which has prevented the development of the kind of wholesaling organization found in the United States. Product differentiation, and the desire of the manufacturer to extend his activities into the wholesaling field for a variety of reasons, including the servicing of his products, may also be an obstacle to the development of a more satisfactory system of distribution in Canada. Lacking more detailed information about this area of activity, it is difficult to form a judgment as to whether or not the distribution of goods requires manufacturers to diversify as much as they believe, or whether it might be possible to evolve a method of distributing manufactured products which would be more favourable to a greater degree of specialization in industry.

Undoubtedly the manufacturers are aware of the problem, and some have taken action to eliminate some of the less efficient lines. Again to quote from the primary textile study:

⁸*The Canadian Primary Textiles Industry*, pp. 48, 49.

"It was recognized in the United States that Canadian manufacturers are fully aware of the adverse effects of this problem on costs and operating efficiency. It was also acknowledged that in recent years some progress has been made in reducing variety, in eliminating some of the more marginal items, in concentrating production in given mills and in specialization by company or by establishment within companies.

"The only comment that American opinion could offer was to endorse a continuation and stepping up of these efforts. Some pointed out to us that a similar problem existed in the United States to a considerably lesser degree and that many of the fringe items formerly produced domestically are now imported. Another expressed the problem as "making a break with the past", or abandoning the inherited policy in both countries that a full line of domestic products must be made available to consumers. A major theme in these comments ran in terms of continuing the present efforts by some Canadian firms and more whole-hearted efforts by others to concentrate mill activity into fewer items or even to concentrate company selection of products".⁹

Recent experience in the leather footwear industry suggests that there is more scope for specialization than is perhaps realized by Canadian industry. The president of the Shoe Manufacturers Association, in commenting on the entry of American firms into Canada, said at the hearings:

"... the advent of American companies into the Canadian shoe industry is regarded by some as a new form of competition, an extremely active competition. They have introduced a highly specialized, large volume type of operation that was not in effect prior—well, not generally in effect—prior to their coming to Canada. The Canadian manufacturers have felt in the past that in order to secure sufficient volume we have had to have a very broad range of footwear, (on the grounds) that the domestic market was not sufficiently large for a specialized type of operation. I think it has been conclusively proven to us now that there is room for specializing in our present domestic market as far as footwear is concerned."¹⁰

It is suggested by some economists that manufacturers are able to fix prices behind the protection of the tariff, thereby limiting competition and permitting the least efficient producers to continue in business. More particularly, it is argued, by eliminating price as a competitive factor, diversification is about the only way a firm can expand its share of the existing Canadian

⁹Ibid, p. 50.

¹⁰Hearings, Ottawa, March 1, 1956, p. 8036.

market.¹¹ We find it difficult to believe that tariff-protected price agreements are prevalent enough to have a significant inhibiting effect on competition and specialization generally. Although the decision to encourage secondary industry in Canada has involved some degree of tariff protection and has encouraged a wider diversification of manufacturing production than would otherwise have occurred, this does not mean that all protected industries are free from price competition either within the country or from imports. It is true that in the abnormal period of the '30's and '40's the tariff and exchange restrictions may have hindered the development of a fully competitive market, but the postwar reductions in tariffs, the expansion of the Canadian market, and the increasingly competitive attitudes of management have combined in recent years to intensify the degree of competition in almost all secondary industries.

On this subject, Mr. Barber states in his study of the electrical manufacturing industry: "Where the tariff is low enough to allow the import of a significant volume of goods the Canadian price will be determined by the laid down foreign price irrespective of the number of firms producing in Canada. Only where the tariff is high enough to keep out the foreign product almost entirely is there room for some measure of tacit or formal price agreement among Canadian producers".¹² While there are undoubtedly some instances of this kind, there do not on the whole appear to be a great many examples of products where import competition is ineffective enough to make possible the kind of price agreements referred to in the Combines report on *Electrical Wire and Cable Products*. However, as Mr. Barber goes on to point out:

"Tariff reductions would be most effective in enforcing increased specialization and greater efficiency where transport costs are not of major importance and where products are not significantly different in the customer's eyes. Both these considerations are true of a range of industrial apparatus. For example, producers of wire and cable would undoubtedly be forced to specialize to a greater extent and thus secure the economies of longer production runs if their present rather high level of effective protection were reduced."¹³

It is suggested by some industry spokesmen that diversified production is safer. This again may in part be a function of the smaller market in Canada; when demand for a product tends to fluctuate the Canadian manufacturer may find himself at the mercy of one or two large buyers who dominate the market, and who may threaten to switch to readily available imports as a bargaining weapon. In fact, it is suggested that some buyers do not wish to tie themselves to one source and prefer to spread the buying

¹¹For a detailed presentation of this argument insofar as it relates to the wire and cable industry, see W. Friedmann (ed.), *Anti-Trust Laws—A Comparative Symposium*, Carswell, 1956, pp. 68-90.

¹²*The Canadian Electrical Manufacturing Industry*, p. 32.

¹³*Ibid.*, p. 68.

among several Canadian producers even at some concession on price. The United States market is so much larger that the American manufacturer is less subject to this kind of spasmodic pressure, although of course exposed to rigorous competitive pressure within his own country. Moreover, with rapid changes in demand which may make a product obsolete almost overnight, the Canadian producer who specializes may in some cases have a more difficult time than his opposite number in the United States in finding alternative outlets for his production. A spokesman for one wire and cable company suggested that in his industry technological changes are so rapid that firms which specialized in a few lines would not know enough about new developments to keep abreast technologically; however, this does not appear to be a significant deterrent to specialization in the United States.

There is another view of specialization which has been stated by a large number of Canadian manufacturers. It is the fear that as a result of the relatively small size of the Canadian market the successful specialist may find himself the only manufacturer of the product in Canada; we have pointed out that for some products an American plant of optimum size may be more than large enough to supply the whole Canadian market. Were there to be only comparatively few producers in Canada, many manufacturers believe that they would be open to prosecution under the Combines Investigation Act or at best might expose themselves to a certain amount of public antipathy. It may be that this appraisal of the consequence of specialization is entirely unwarranted, particularly in view of the strength of import competition. Moreover in some industries where scale is important, such as certain types of chemicals, production for the whole country is already concentrated in one or two plants, and there appears to be little concern expressed about the monopolistic aspects of such industrial concentration either by the administration of the Combines Investigation Act or by the public generally. Nevertheless, the feeling that undue concentration might lead to undesirable consequences is fairly widely held by business representatives, and this does appear to have had some inhibiting effect on specialization.

In summary, in competing with United States producers, Canadian secondary industry is handicapped by its smaller market and inability to obtain the same economies of scale as its American competitors. These economies stem not only from the direct advantages of the large size of market but from greater specialization and concentration of production. For reasons which we have suggested, Canadian secondary industry is a good deal less specialized and concentrated than considerations of productive efficiency alone would appear to warrant. In absolute terms, however, Canadian production tends to be more concentrated than in the United States; there are generally fewer firms and the larger firms have a greater proportionate share of the business. This is a normal consequence of the very much smaller size of the Canadian market. But it is against American standards that the

efficiency of Canadian secondary industry is here being judged; on this basis the only conclusion that can be reached is that greater concentration of production is required if we are to approach United States levels of efficiency. It is of course very difficult to determine what the extent of concentration in any Canadian industry might be if production were carried out in plants which approximated as closely as possible the minimum efficient size of plant in the United States. However, some estimates are given in the Commission's study of the question of concentration.¹⁴ Even though for many products one plant of minimum efficient scale by United States standards would be large enough to supply most or all of the Canadian market, substantial economies in costs could undoubtedly be achieved without reducing the number of Canadian producers in such a drastic manner.

In conclusion, it should be pointed out that the growth of the Canadian market in the past two decades, together with an increasingly competitive business environment, has somewhat reduced the disabilities suffered by Canadian producers as a result of the smaller volume and less specialized nature of our secondary manufacturing production. Despite some reduction in over-all tariff protection this has brought about a slight decline in the import share of the market for products of secondary industry. At the same time it must be noted that the cost disadvantages are still very significant, and that the improvements which have occurred have on the whole been comparatively small.

Effects on Individual Industries

We turn now to examine how these general considerations of size of market, scale, and specialization affect various secondary industries. The examples are mainly taken from the studies, submissions and the testimony of witnesses; it is of course impossible in a broad survey of this nature to provide more than an abbreviated presentation of the analysis. It must also be emphasized that while broad conclusions may be drawn, they may be inapplicable to individual industries or products. Finally, any attempt to assess how these factors affect the relative position of Canadian industry must have regard to different conceptions of "ability to compete". In terms of pure economic efficiency, a Canadian industry may be said to equal its American counterpart if its physical output per man hour is as great. A very few industries and firms are in this category. A somewhat broader group is composed of those secondary industries which can produce goods to sell at the same price as the American product, but only because of the lower level of Canadian wages. In addition, there is the still larger group of industries which can compete in the Canadian market with United States imports because of the tariff or natural protection; this protection varies widely from industry to industry. Wages and other cost factors will be considered in detail in later chapters and our analysis here will be primarily concerned with the effects

¹⁴*Industrial Concentration*, Chapter 3. Estimates are based on research by J. S. Bain and G. Rosenbluth.

of scale and specialization on the ability of Canadian manufacturers to compete with American imports, given the existing level of wages. We shall try to indicate in the text the role played by tariffs and tariff changes in order to isolate as much as possible the effects of scale and specialization on individual industries.

The Commission study of the primary iron and steel industry refers at some length to the effect of volume on costs:

"... generally speaking the Canadian industry is at little disadvantage as compared with the American up to the blast-furnace level, except to the extent that the average size of blast furnaces is somewhat smaller in Canada than in the United States. In fact, the disadvantage is probably not very great up to the ingot level, except, again, to the extent that steel furnaces, too, are on the average smaller than in the United States . . .

"At the rolling-mill level, however, the Canadian industry cannot hold its own so well on the score of costs . . . The entire Canadian production of steel is less than the individual output of a number of the large U.S. mills and the Canadian companies are relatively small, only one of them having an ingot output of as much as 2 millions tons, and two of them being below 1 million tons. There are of course many companies as small as this in the United States, but because the market is large they have more opportunity for specialization. They do not attempt to serve as widespread a market with as great a variety of products as the Canadian mills do."¹⁵

This study goes on to emphasize that because of the less specialized nature of output, Canadian steel mills have to use more versatile equipment, and this tends to result in idle time while the equipment is being changed; moreover, because of the relatively smaller size of Canadian orders, more frequent adjustments to the machinery are required:

"One company reports that over a two-month period the average size of the orders put through a U.S. 56-inch hot-strip mill was 2½ times that of the orders put through its own hot-strip mill, and that consequently the number of changes for gauge and width was only around 40% of the number required in that period on the Canadian mill . . . How much all this decreases productivity it is difficult to say. But certainly per man-hour productivity, which as has been suggested is probably nearly as good at the blast-furnace and open-hearth stages as in the U.S. industry, is lower than in the U.S. industry at the rolling mill level, probably by a fair margin. This is so even though productivity in the Canadian industry, whether measured by ingot output per man-hour or net value added per man-

hour, appears to have increased since just before the war by something like one-third."¹⁶

The pattern of primary steel imports broadly reflects the extent to which Canadian steel producers are handicapped by size of market and scale. Products for which the Canadian market is relatively large and the diseconomies of our smaller market are not excessive tend to be manufactured in Canada; examples of such products which can be economically manufactured in Canada, and where the import share of the market is low, include not only products up to the rolling mill stage but rails, galvanized sheet, tinplate and many types of steel plates and strip. As shown in Table 22 of the Iron and Steel Study prices of these items are not very different from those in the United States. On the other hand, many products which require a very large market for economic manufacture are not made in Canada while others of these that are manufactured here are subject to severe import competition. Of imports of rolling mill products the two largest groups were structural steel and uncoated sheets and strip, which together make up over half of the total. As we indicated in the last chapter, the minimum economic size of a mill to roll wide flange structural steel beams has a capacity of over three times the total Canadian demand. Capital costs of such a mill are very heavy, and the economies of scale, particularly in the manufacture of the larger sections, are substantial. Much of the sheet and strip imported is of larger size than is manufactured in Canada; the combination of a limited market and large size of minimum efficient units again is the principal explanation for the large volume of imports.

It is interesting to note that typical tariff rates on primary iron and steel products run from 5% to 15%, with the ad valorem equivalent of duty collected in 1953 and 1954 averaging about 8%. This is appreciably below the average for secondary industry as a whole. Due largely to the effect of rising prices on specific duties this average is also considerably lower than the average protection prevailing before the war; indeed in some cases, such as plates, the protection is less than half its 1938 level. Nevertheless because of the gains accruing from the larger domestic market, improved machinery and techniques, and the introduction of new products by able and aggressive management, the import share of the market for primary iron and steel products has declined from over 40% in the late '30's and around 50% in the '20's to just over 25% in 1953. As already indicated, many of these imports are non-competing, and the fall in directly competitive imports has therefore been even more dramatic; for example imports of tinplate fell from 79% of the market in 1935-39 to 24% in 1948 and 4% in 1955.

When business conditions are active, of course, imports of many standard items made by the Canadian industry may be substantial because domestic production is insufficient to meet the demand. Moreover, although high

¹⁶Ibid, p. 18.

freight costs on steel act as a protection for Canadian producers in the important southern Ontario market, freight disadvantages make it more difficult for them to meet some types of import competition on the west coast. As a consequence, imports from mills in the western United States and from overseas supply a much larger proportion of the British Columbia market than they do for the country as a whole. However, overseas competition tends to be somewhat spasmodic in nature. When steel is plentiful, the prices of the overseas producers are reduced sharply, and when it is tight, their prices rise above those of Canadian producers. In recent years, however, imports from overseas have rarely exceeded 20% of total imports, and the predominant source of import competition has always been the United States.

Another industry in which the economies of mass production and specialization are very large due to the complex nature of the product is the automobile industry. However, in spite of the fact that Canadian output is only one-twentieth that of the American industry Canadian producers have achieved a reasonable level of relative efficiency. Nevertheless, considerable cost disadvantages are experienced by the Canadian industry, not only at the assembly line stage of production, but also in the manufacture and purchase of component parts. The Canadian demand for the popular automobiles in the lower and middle price ranges is large enough to support assembly operations that do not involve an unduly heavy cost penalty, although the size of the American market permits somewhat more specialization. Despite the higher price that must be paid for parts in Canada, manufacturing costs for a composite low-priced automobile are only between 10% and 15% above those in the United States; the growth in the Canadian market over the past two decades has brought this differential down to its present level from some 25% in 1935. However, the relatively small domestic demand for the highest priced automobiles renders Canadian production costs prohibitive and these models are therefore imported from the parent in the United States.

At the preproduction level, including development engineering and tooling, the expenses of bringing out a new line of automobiles are enormous. A spokesman for the Ford Motor Company of the United States estimated that these launching expenses for the 1957 line amounted to \$209 million. On the basis of a unit volume of 1,500,000 to 2,000,000 automobiles the amortization of a sum of this size is not excessive; for the equivalent Canadian market of 75,000 to 150,000 cars it would be prohibitive. However, as all automobile producers in Canada are subsidiaries of American firms, they have access to the fruits of the parent company's expenditures on research and development, and share the costs presumably on some basis related to volume of output. It is not surprising that in recent decades there have been no cars of purely Canadian design manufactured and sold in volume in Canada; the recent difficulties of the smaller automobile manufacturers in the United States who must attempt to match the frequent design changes of the "big three" and amortize the costs over a very much lower

volume, illustrate in a small way the very great problems which would face a Canadian producer undertaking to design and manufacture a Canadian automobile. An illustration of these difficulties is given in the Commission study of the automotive industry in which the effects of volume on costs of a small forging were estimated. On the basis of a production run of 4,000 units against 40,000 units, costs are about 30% higher per unit of output. Canadian parts manufacturers can usually approach United States costs on the simpler, large volume items where economies of scale are important but not dominant. However, as the complexity of the part increases, and the capital costs of manufacturing it mount, the cost handicap for the Canadian producer rises. Volume becomes all important when the part has style features which involve frequent changes and rapid amortization of heavy initial design, die, tooling and capital costs. Such items as large body stamping, frames, and automatic transmissions are in this group, and as the Canadian market for them is not large enough to make production possible on a reasonably economic basis they are imported from the parent company.

The extent to which parts are imported or manufactured in Canada is affected by the tariff as well as by the economic factors involved. The Canadian automobile tariff is designed to encourage the production of parts in Canada while at the same time providing some flexibility for the manufacturer in choosing whether to buy from domestic sources or in the United States. The tariff legislation provides that if the manufacturers obtain a certain minimum Empire (in effect Canadian) content, 60% for the large producers, they are entitled to duty free entry on a broad range of parts of a class or kind not made in Canada. It is stated in the automotive study that within this tariff framework the manufacturers have usually been able to buy enough parts in Canada to achieve the content requirement without paying more than a maximum 15% above United States prices. The MFN tariff rates on imported parts of a class or kind made in Canada are 17½% and 25%, with most imports in the last category. Used automobiles are not allowed entry. The 17½% rate applies on fully manufactured cars, and as previously noted all the larger cars are imported over this duty. Competitive imports from the United States are usually small, however, presumably in some measure due to the close corporate links between Canadian and American producers. Despite some freight disadvantage, domestic manufacturers retain the bulk of the west coast market by absorbing some of the freight costs. Although competition in British Columbia from United Kingdom and German producers is above the national average, with the United Kingdom having the additional advantage of free entry under British Preference, the inroads of these producers in the Canadian market have not been great in the past five years.

In the production of aircraft the very heavy initial costs of design, pre-production development, engineering and tooling make the size of the market a crucial factor in determining whether or not economic manufacture can

be undertaken. In a *Statement on Canada's Aircraft Industry*, submitted to the Commission by the president of Canadair, it was stated that the company had considered the construction of a new type of transport. Its estimates showed that the costs of manufacturing a 32-passenger modern aircraft, up to the completion of the first aircraft, would be \$12 million. To compete with similar types of aircraft, the maximum price which could be charged was \$450,000. On the basis of a production run of 40 aircraft, estimated costs per unit worked out at about \$1,000,000. If 100 aircraft were manufactured costs would be cut to \$670,000 per unit, and to bring costs down to the \$450,000 level, with no profit, would necessitate the sale of 300 units. It did not appear that orders of this magnitude would be forthcoming and the project was abandoned. It must be emphasized, however, that the largest part of the Canadian aircraft industry is not exposed to the normal competitive forces of the marketplace. Although some large aircraft orders have been received from other countries, the Canadian government defence procurement programme provides the main basis for the industry's existence. While industry representatives suggest that Canadian development and production costs per unit of output would compare favourably with those in the United States if the volume of orders were large enough, it is not surprising that the costs of manufacturing aircraft in Canada are considerably higher when production runs are small.

In the railway rolling stock industry, as is indicated in Table F, the United States-Canada output ratio is lower than for any other secondary industry, and economies of scale are therefore not as important a handicap in some segments of the industry. However, in the production of diesel locomotives, the structure of the industry parallels that of the automobile industry, with the three Canadian producers controlled by the three largest manufacturers in the United States. In effect, the same number of producers are sharing a smaller market and therefore suffer to a considerable extent from the diseconomies of scale. A spokesman for the industry estimated that prices are up to 15% higher than in the United States, although Canadian locomotives are slightly different from the United States design. Scale of production is a factor in the cost differential not only for the complete locomotive but for many component parts as well. Larger markets in the United States permit both more single-purpose tooling and more output from facilities of the same type as those used in Canada. Components which cannot be manufactured economically in Canada are imported and with the exception of parts for the engine itself which enter duty free, must pay a duty of 25%. This contributes significantly to the higher cost of production in Canada. In fact, it was stated that with the duty drawback, which applies to exports, Canadian manufacturers can compete successfully with American and European manufacturers in foreign markets.¹⁷

¹⁷Hearings, Montreal, Jan. 20, 1956, pp. 3978-3994.

In the manufacture of standard box cars scale does not appear to be an important direct cost consideration, although insofar as it raises the costs of materials used by the industry it does contribute to somewhat higher costs of rolling stock in Canada. One observer who had inspected assembly lines for freight cars in both countries considered the Canadian operation at least as efficient as that of one of the largest United States producers, with volume of output nearly as great. The fact that over-all costs are higher in Canada is due only in part to the more expensive material which we have mentioned. The spasmodic way in which orders have been placed by Canadian railways has tended to put the industry on a "feast and famine" basis, with plants idle part of the year and then running at an overtime basis, and this has added to costs. It has also been suggested that specifications laid down by the Canadian railways may be somewhat too stringent and the quality of Canadian produced freight cars is considerably—and unnecessarily—higher than American freight cars. Despite lower wages, the combination of cost handicaps we have noted have caused prices to be some 5% to 10% above American levels. In the production of passenger cars, and the lower volume types of freight cars, the industry is at a somewhat greater disadvantage from scale, although it has nevertheless supplied most of the requirement of Canadian railways.

The manner in which some sections of the electrical manufacturing industry have been affected by scale and specialization have been mentioned earlier in the chapter. Mr. Barber classifies the output of this industry into three broad categories, the first consisting of products which are largely custom built, where volume of output is not an important cost factor, and where the principal competition comes from the low wage countries overseas and not from the United States. The position of Canadian manufacturers of these products is referred to in Chapter 5. In the second category is the highly mechanized production of standard products such as lamp bulbs, where the Canadian market is large enough to support a plant of close to optimum size. In this instance, and in certain standardized products and small appliances, Canadian costs approximate those in the United States; one might also include in this category such medium-sized appliances as floor polishers and conventional washing machines in which, as already noted, the Canadian market is larger than average in relation to the United States.

A third category is typified by electric ranges and refrigerators where due to their smaller volume of output Canadian firms have difficulty in approaching American costs (the style and design of overseas models, with the possible exception of vacuum cleaners, have prevented them from becoming a factor in the Canadian market). As already indicated the disadvantage stemming from the small size of the Canadian market is accentuated by the large number of firms competing for Canadian business. One firm estimated its costs were 11% higher than its United States parent's on electric ranges, and

20% on refrigerators, another said its costs were 20% higher on ranges, while Mr. Barber estimates that Canadian prices of refrigerators were about 17% higher than the United States prices, and of ranges 20% higher. The higher costs in Canada are due to a number of factors—multi-purpose rather than special purpose machinery, more time spent on changeovers, and less automatic machinery, more expensive design, tooling and process engineering costs per unit. The study quoted one firm as estimating that its tooling costs per unit on ranges and refrigerators amounted to \$5.75 and \$5.00 respectively compared with equivalent unit costs in the United States of \$0.60 and \$0.50. Moreover, these Canadian costs would be much higher were it not for the fact that the parts for which tooling and engineering costs would be almost prohibitive are generally imported from the parent or associate company in the United States. Canadian producers also reduce the impact of the scale handicap by making less frequent model changes than the United States parent, and by concentrating on the larger volume models and rounding out their lines by importing certain models from the parent.

It is evident that imports from the United States tend to be concentrated in those components and finished electrical products where disadvantages of scale are greatest. The level of these imports is affected in some degree by the tariff, the MFN rates on most electrical products being 20% or 22½%, but there are many products which cannot be economically produced in Canada even with this tariff protection. However, in spite of a significant reduction in tariff protection since 1929, with the average ad valorem rates on dutiable imports falling from 27% to 21%, Canadian producers have maintained or slightly increased their share of the domestic market. This reflects an improvement in their competitive position due to the growth of the domestic market, increased specialization and the pressure of more competitive conditions in Canada itself.

It must be noted, however, that in this and other industries protection may be somewhat greater than indicated by the nominal rate of the tariff. In the first place, there may be a significant difference between the effective and nominal protection; this occurs in products where components are not greatly different in price in the two countries and where these components are an important element in the price of the final product. An example is the manufacture of certain types of covered copper wire in which the proportion of costs represented by the copper is some 50%. With copper about the same price in both countries, and the tariff rate 20% on the final product, the effective rate of protection on the 50% of the selling price which represents the actual manufacturing cost is twice as great as the nominal rate. Products in electrical industry which may benefit significantly from a high rate of effective protection include batteries and lamps as well as wire and cable. However, prices of many of these commodities are not very different from American prices and it would appear that this protection is by no means fully used. Similarly, the safety requirements of the Canadian Standards As-

sociation, a body composed of representatives of the industry, governments, contractors and electricians, may provide some additional protection in certain products. Canadian standards are frequently higher than in the United States; a notable example is the requirement that electric ranges have separate fusing for each element which adds to the costs of the American producer and neutralizes some of his advantages of scale.

In the related electronics industry conditions are similar, and in many products the difference in size of the market gives the American producer an appreciable advantage from the size of his operations. The Commission's electronics study has some reference to this:

"Special machinery and equipment is bought from highly skilled machine-tool manufacturers, the majority of whom are located in the United States. In many cases this machinery and equipment has to be modified to Canadian specifications or adapted to more flexible operations. U.S. machinery for the manufacture of vacuum tubes, for example, is designed for the high-speed production of long runs of one particular type. In some cases over one million tubes may be produced in one run, while in Canada the average run amounts to only 100,000 units. Consequently alterations have to be made to make the machinery suitable for short runs. These modifications increase the cost of the machinery and equipment involved."¹⁸

The cost handicap of Canadian manufacturers appears directly related to volume of demand in Canada. According to the study, the costs of fixed resistors, which are manufactured in large quantity in Canada, are about the same as in the United States; on the average, Canadian made components run about 10% to 15% higher in costs. On tooled parts such as metal sub-bases, plastic cabinets, and aluminum moldings, however, the difference in price is often over 20% and many of these parts are imported from the United States, where tooling costs can be spread over a much greater volume. Scale is also a particularly important cost consideration in the manufacture of receiving tubes in which the average run in Canada amounts to over 100,000 units as against perhaps 1,000,000 tubes in the United States. The study indicates that Canadian costs for this item ranged up to 100% higher, with one estimate suggesting an average difference of close to 25%. In striking contrast, Canadian prices of television picture tubes were about the same as in the United States. In part this was due to the fact that the expensive glass envelopes for these tubes were brought in from the United States duty free, but a more important consideration appears to be the similarity in size of manufacturing plants in the two countries. In Canada in 1955 there were three manufacturers, with an average annual production of 220,000 tubes; in the United States the average output of the 40 manufacturers was 250,000 units, broadly the same as in Canada. The importance of scale was em-

¹⁸*The Electronics Industry in Canada*, p. 11.

phasized by an industry representative who stated that engineering costs are usually competitive, the difficulty being that of amortizing these costs over a relatively low volume. He went on to say:

"The Canadian electronics industry can compete with American producers on low volumes of specially engineered products where engineering is a significant part of the total billing and the Americans are not able to take advantage of their mass production techniques."¹⁹

In appraising the position of the Canadian electronics industry, it must be noted that the extent of its tariff protection, around 20%, is increased by several special administrative and legislative procedures. Between one-quarter and one-third of the industry's output in recent years has been purchased by the government for its defence programme; in many cases government purchases are made not solely on cost considerations and are designed to encourage Canadian production. We have already referred to the requirements of the Canadian Standards Association; these may make modifications of some foreign designs necessary and thus raise the costs of the foreign product, and possibly prohibit its entry into Canada. In addition, the operations of Canadian Radio Patents Limited, set up to pool patents and to facilitate licensing negotiations and royalty payments procedures for most electronic products, has some protective effect. While in view of the multitude of patents in this field some such pooling arrangements are essential if chaos is to be avoided, it has been suggested that the powers of the company to penalize unlicensed imports have been used from time to time as a protective device.²⁰ Finally, the use of 25 cycle power in the area around Toronto places Canadian manufacturers supplying this equipment in a virtual monopoly position.

It would nevertheless be wrong to leave the impression that the industry in Canada has prospered only because of these special protective factors. Although government defence and research expenditures have stimulated the growth of the industry, the sharply rising civilian demand for its products and the special dynamic derived from the industry's research programme in Canada and in other countries have been even more important. Although inevitably most new products are developed and manufactured first in the United States, the cost position of the Canadian industry appears to be improving and the share of competing imports has declined slightly. Moreover, the maturing of the Canadian industry has been accompanied by the development of certain new products in Canada.

The production of industrial machinery, like electrical equipment, involves the manufacture of both custom made and mass produced products. Machinery in the first group is usually labour intensive, long runs are not

¹⁹Submission by president of Canadian Aviation Electronics Ltd. Part II, p. 14.

²⁰Ibid. pp. 21 et seq.

an important cost consideration, and the principal competition for Canadian manufacturers comes from the low-wage overseas countries, particularly the United Kingdom. For products which are relatively standardized—machine tools and other metal working machinery, construction, textile and printing machinery—the advantages of scale are large, and the size of the Canadian market is comparatively small. Although there is some domestic production in these standard machinery lines, it is primarily an assembly operation, with design and complex parts obtained from a parent or associate in the United States, and in some instances, the United Kingdom. In this group of machinery products imports also supply a substantial proportion of the Canadian demand. In fact, taking industrial machinery as a whole, about three-fifths of Canadian requirements are imported, with 87% of total imports originating in the United States. It is interesting to note that the import share of most industrial machinery items is substantially higher than that of comparable electrical machinery. This is due to the relatively smaller size of the Canadian market for industrial machinery, to the greater importance of scale in its production, and to the existence of a greater number of class or kind items which cause average rates of duty to be lower than in the case of electrical machinery. For products of a class or kind not made in Canada the tariff rate is B.P. free, and MFN, $7\frac{1}{2}\%$; for products of a class or kind made in Canada the rates are B.P. 10% and MFN $22\frac{1}{2}\%$. As the bulk of import competition comes from the United States, the greater part of Canadian production receives $22\frac{1}{2}\%$ protection. In the Commission's study of the industry, however, it is suggested that the determination of whether imported machinery is of a class or kind made in Canada is more difficult than for most other products, due to small variations between each type of machine (the industry feels that in cases of doubt the decisions tend to favour the importer).

The degree of tariff protection may also be affected by the fact that due to the special nature of some of the imported machines a fair market price cannot be readily obtained, and this may make dumping more difficult to detect; moreover many imports are manufactured to contract, and no action on dumping can be taken until after delivery. Another aspect of this question is the extent of tariff exemptions for machinery used in some of the extractive industries—the so-called “end-use” exemptions. It is difficult to establish how much these special provisions limit the effectiveness of tariff protection; certainly for some types of machinery they are important. At the same time, Canadian manufacturers have a considerable amount of natural protection arising out of their proximity to the consumer. The services which accompany the sale of a machine—advice and consultation before purchase, installation, and future servicing—are becoming an increasingly important part of the sale package, and the Canadian machinery is in a much better position to supply them and to give earlier delivery. These advantages, together with superior Canadian designs in some cases, are translated into

price; usually the buyer is prepared to pay something more for a Canadian machine. This is a particularly important advantage vis-a-vis overseas competition. In addition, as we have indicated, Canadian producers supply a large share of the machinery used by our rapidly growing primary industries; this relatively large and expanding market has provided increasing advantages of scale, and the accumulated "know-how" of several decades of producing special machinery for these industries enhances the advantages accruing from location in Canada. Despite the tariff reductions of recent years, these factors have enabled the Canadian industry to maintain its share of the domestic market.

The agricultural implements industry is in a different position from most secondary industries in that it has access to the United States market on a free entry basis. As a result the industry in the two countries has become much more specialized. It is pointed out in the Commission study of the industry that in products such as the self-propelled combine, which was developed in Canada and which has been exported in large quantities to the United States, scale of operations has been no handicap to the Canadian producers. On the other hand the system of distribution, involving single-company dealerships, has tended to thrust a certain measure of diversification back upon the manufacturer in order that his dealers may carry a full line of products. The relatively late arrival of the Canadian products on the American scene has meant that the Canadian controlled companies have a less developed distribution system in the much larger United States market. This appears to have affected the competitive position of the Canadian industry adversely; in the event the American industry has tended to develop along more specialized lines which confers an advantage on them in many products other than the smaller types of machinery and the self-propelled combine. The United States industry also appears to benefit from its freight advantage in the larger part of the North American farm market. Moreover, better management may have contributed to the strong position of the American industry. The effects of these factors are reflected to some extent in the allocation of production between the two countries. In recent years Canadian output has averaged between one-tenth and one-twelfth as large as the American compared to one-eighteenth for secondary industry generally. However, the Canadian market for agricultural machinery is even larger relative to the United States, consumption being roughly one-seventh of the American level. The disparity between relative outputs and markets is of course in large part accounted for by the fact that few tractors are made in Canada; if tractors are excluded from the production figures of both countries the ratio of output would be between 7 and 8 to 1.

In the chemical industry, processes are generally of a flow nature and lend themselves to highly capital-intensive procedures. As a result the size of markets and output and the degree of specialization, with the principal exception of some consumer products, tend to be an important influence on

costs in the secondary section of the industry. In contrast, many primary chemicals such as fertilizers and heavy industrial inorganics have relatively large export or domestic markets, being used mainly by the natural resource industries. It is estimated in the Commission study of the chemical industry, however, that the American market for all chemicals is 20 times the Canadian. The average Canadian plant for the production of secondary chemicals is usually one-third to one-half the size of its American counterpart and is also less specialized. A representative of one of the large chemical companies said that it is seldom that processes used in the United States for the large scale manufacture of chemicals can be employed in Canada without substantial adaptation. Although the engineers employed by his firm had acquired considerable expertise in modifying the processes and installations of the United States parent company to reduce output to a level appropriate to the Canadian market, for most products Canadian costs were appreciably higher because of the smaller volume. Another industry representative stated that an ethylene glycol plant with a capacity of 120 million pounds costs only twice as much to build as a plant one-quarter the size. Although Canadian costs are higher than those in the United States, tariff protection for most chemicals in the secondary industry sector generally runs from an MFN rate of about 15% to about 25%. Imports consequently have less than 20% of the market for most products, and it is interesting to note that the import share of the market for soap, where the Canadian volume of demand is relatively large, is only 1%.

The competitive position of the Canadian fine and specialty paper producers, who are restricted largely to the small Canadian market by foreign tariffs, is in sharp contrast to that of the newsprint producers. These latter producers, who supply a large share of American and world requirements, have the advantage of long runs and specialized production. On the other hand the fine paper producers suffer from the competitive disabilities arising out of their shorter runs and lack of specialization:

"Canadian manufacturers had to equip themselves, and operate, to produce a large number of different grades, weights and colours in short runs, and to ship them at higher transportation costs in an east-west movement to supply the Canadian market. Within these limitations, these segments of the industry have had some success in lowering their cost and increasing their efficiency. But substantial cost disabilities remain by reason of the nature of the market on which they depend. In contrast with manufacturers of these grades in the United States, these mills in Canada cannot generally get the cost advantages of long runs and mass production methods. For example there are nearly 500 grades of book and writing papers manufactured in Canada; the average manufacturing run of boxboard is probably about 11 or 12 tons. In the United States, a writing paper mill may produce only eight or ten different grades in very large

volume; a paperboard machine may run continuously on only one grade. When a machine is changed from one grade to another there are substantial costs incurred in idle time and the cleaning of machines and the start-up on a new grade. These "make-ready" manufacturing costs are virtually the same for a 25 ton order as they are for a 2500 ton order but the cost per ton is one hundred times as great."²¹

Despite these disadvantages, the import share of the market for the types of paper in this group, including book, writing, groundwood, tissue and wrapping papers, is less than 5%, and has in fact fallen sharply from the level of the 'twenties as the Canadian market has grown.

For the largest part of remaining secondary industries the effects of scale and specialization are also of importance. This is particularly true of the other iron and steel using industries and also of those secondary industries which are based on the fabrication of important resource materials such as aluminum, copper, brass, nickel, asbestos, and petrochemicals. One has only to examine the testimony and the hearings to find many additional striking examples of the effects of small scale operations on costs. The effects of short runs on the primary textile industry are apparent from the extracts from the study already quoted; the industry is less mechanized than in the United States and the inability to obtain long runs affects particularly the costs of such specialized products as printed and woven fabrics. In addition, large segments of the Canadian industry are labour-intensive and subject to competition from the overseas countries. The factors affecting the industry's competitive position will be dealt with more fully in the next chapter. In the clothing industry, which is also labour-intensive, scale would appear to be a considerably less important factor, except possibly in such items as the mass-produced cheaper types of women's and children's dresses and some types of men's factory clothing. In the rubber industry the effects of scale show up in the relative prices of tires in the United States and Canada; on standard passenger tires which can be produced in Canada in large volume, our prices are about the same or very slightly higher than in the United States. On lower volume tires of domestic manufacture Canadian prices are up to 20% to 25% higher; indeed some types of tires with a limited market in Canada are not produced in this country at all. For labour-intensive products such as rubber footwear, scale is not important and the principal competition comes from the low-wage countries.

There are a few secondary industries, however, in which scale of production and the size of the market is large enough to permit Canadian manufacturing to be almost as efficient as in the United States. These include the brewing and distilling industries, some types of food and fish processing, and some oil refining operations. Imports of competing products in these in-

dustries are relatively small, although the successful retention of the home market by domestic industry may be due in some degree to tariff or other forms of protection. However, in terms of their share of total output and employment, these industries are a small group. For most secondary industries the disabilities arising from the smaller size of the Canadian market appear to us to be the principal explanation of why real output per man-hour in Canadian secondary industry is some 35% to 40% below that of the United States, and why prices in this sector are higher in Canada despite the lower wages paid in this country.

We have already pointed out that these disadvantages arising from scale have faced Canadian secondary industry throughout its history, in spite of the growth of the Canadian market. While there have been small but worthwhile gains in the relative position of Canadian secondary industry over the past two decades, it should be emphasized that in this period as in earlier periods the optimum size of production unit in almost every industry has also been increasing steadily. The continuing growth of the already large United States market has meant in effect that increases in the scale of operation of Canadian producers have to be large merely to keep pace with American competition. The fact that the gap has been narrowed somewhat in recent years mainly reflects the more rapid growth of the Canadian economy, although it has also been due to some catching up in management and competitive efficiency. It is obviously impossible to measure precisely the effects of smaller scale and less specialized operations on the gap which remains between the real output of Canadian and American secondary manufacturing. However, in our judgment these factors account for not less than three-quarters of this difference. It is hardly necessary to add that both the size of the gap itself and the effects of scale and specialization vary widely from industry to industry.

WAGES AND LABOUR COSTS

WAGES and salaries in Canadian secondary industry are some 25% below those in the United States although they are on the average more than double those of overseas countries.¹ As wages and salaries account for just over half of the value added in Canadian secondary manufacturing production and over three-quarters of the more truly net measure of Gross Domestic Product, it might be expected that the principal source of import competition for Canadian secondary industry would be the overseas countries rather than the United States. In fact, however, as we have already pointed out, some five-sixths of such competition comes from the United States, about 12% from the United Kingdom, and less than 5% from the other overseas countries where wage levels are usually particularly low. Our first purpose in this chapter will be therefore to show the general relationship between wage differentials and the comparative costs of secondary manufacturing production in Canada and other countries. We will then proceed to describe and analyze briefly the level of wages in different secondary industries in Canada and their relation to import competition, particularly from the overseas countries, and will end the chapter with a short discussion of some of the non-monetary factors which may affect labour costs in this country.

Wage Determination in Canada

The seeming paradox of Canadian wages being higher, but domestic manufacturing costs being lower, than in overseas countries, (with the reverse being true in relation to the United States) can in practice be resolved by considering the basic determinants of wages within a country generally. Fundamentally, wages in a country are determined by the supply of labour and by the average productivity² of that labour in the country *as a whole*.

¹See Table 35. All international wage comparisons in this chapter will be expressed in terms of Canadian dollars unless otherwise noted. Due to lack of data, these comparisons had to be made on the basis of hourly earnings rather than basic wage rates. In many respects this method is more realistic.

²There is some dispute among economists as to whether marginal or average productivity is the determining factor in the wage-setting mechanism, although in practice the two concepts are not likely to yield very different results. As average productivity is a reliable index to changes in the demand for labour, we have used it here without feeling it necessary to become embroiled in this debate.

There are of course wide variations from industry to industry within this framework, due to variations in a number of factors such as the nature of labour skills required, the relative attractiveness of different jobs, and the mobility of certain types of labour. Nevertheless, all Canadian employers, whether in a broad sector of the economy, an individual industry, or a single firm, must pay the going national wage determined by the average productivity of Canadian labour and modified by these supply factors. The industry or sector in question is able to pay these wages without impairing its competitive position only if its labour productivity is at or above the national average. However, those sectors of the economy in which real productivity is relatively low in relation to the supply of labour skills required are less favourably situated. They generally find that paying the going wage causes their unit labour costs, and probably their unit production costs as well, to be above those of their competitors elsewhere. In short, industries with a comparative advantage of production in Canada will not be adversely affected by the level of Canadian wages, while those with no such advantage will usually find Canadian wage-level to be relatively high.

Viewed in this light, it is easier to understand why the main import competition for Canadian secondary industry comes from the United States rather than from overseas. On a man-hour basis, both the level of earnings in secondary industry and average real productivity in the Canadian economy as a whole appear to be close to 25% below the comparable figure in the United States.³ As already noted, the real productivity difference in the secondary industry sector amounts to some 35-40%,⁴ largely due to the smaller scale of manufacturing operations in Canada. Since the productivity difference in this sector is greater than the wage differential, labour costs per unit of output are actually higher in Canadian secondary manufacturing than they are in the United States. Thus, to take but one example among the many which could be cited, the Commission's study of the automotive industry indicates that total labour costs in the Canadian automobile industry account for a higher percentage of final selling costs than they do in the United States industry. This is true despite the fact that in Canada the share of direct labour costs per automobile is lower because many of the more complex parts are simply imported and assembled, while in the United States many of these parts are manufactured by the car producers themselves.

Conversely, the low level of manufactured imports from the overseas countries is due primarily to the fact that the level of wages and total productivity in these countries is not as low in relation to Canada as is their productivity in secondary industry generally. The basic reason why Canadian domestic manufacturing productivity is both absolutely and relatively high compared to the overseas countries is the fact that the great majority of

³See Table 3, Chap. 12, *Canada-United States Economic Relations*, Royal Commission on Canada's Economic Prospects, 1957.

⁴See Chapter 7 of this study where productivity is discussed more fully.

our secondary industries lend themselves to the use of highly mechanized processes and advanced techniques not generally available in the overseas countries. Our ready access to American capital, technology, and research in effect gives us a significant advantage over overseas producers in the secondary industry sector. On the whole, our level of capital investment is much higher, our machinery and equipment is more modern, and our processes of production are more efficient. With the exception of certain products in which large amounts of relatively unskilled labour are an important part of final selling prices, Canadian unit labour costs in secondary industry are therefore considerably below those in overseas countries despite the much lower wages overseas. Indeed, it is precisely because manufacturers in these low-wage, low-productivity countries are generally high-cost producers that they need to make use of restrictions to keep out imports of Canadian secondary manufactured products.

In the foregoing brief analysis, no reference was made to the tariff or other forms of protection provided for Canadian industry. The existence of tariff protection does not in any way change the physical productivity or costs of production of the protected industry, although of course it adds to the costs of industries consuming its products. An increase in protection to a low-productivity industry, by raising the price of competing imports, simply enables it to raise its own prices and thus puts it in a position to pay more for its labour than its real productivity warrants. If the protection given is sufficiently high the industry in question will be able to attract all the labour it needs. Conversely, if a reduction in protection in such an industry is not matched by an increase in its efficiency, it will be compelled either to reduce its wages to a level more closely approximating the real productivity of its labour or to decrease its output. This analysis, of course, does not apply to industries which, because of domestic competition, are not affected by small changes in either direction in their nominal tariff protection. Account will be taken below of significant changes in tariff protection when wage trends in individual Canadian secondary industries are related to import competition.

Having noted that the level of wages paid by Canadian secondary manufacturers is broadly determined by the average productivity of labour in the economy, modified by the level of tariff protection as well as by variations in labour supply, we turn to an examination of wages and earnings in our domestic manufacturing industry. On the basis of available statistics it was not found possible to construct an over-all series of hourly earnings which would apply only to employees of secondary manufacturing and we have accordingly used average hourly earnings in all manufacturing, both primary and secondary. From examination of those separate series which are available for primary manufacturing, it does not appear that this method greatly affects the results; hourly earnings in pulp and paper mills and the non-ferrous metal industry (largely comprised of non-ferrous metal smelting and

refining) are considerably above the average, while in saw and planing mills and certain types of primary food processing they are somewhat below. On balance, hourly earnings in all manufacturing may well be very slightly higher than the average for secondary industry alone. This figure in 1955 averaged about \$1.45, and by October 1956 had risen to \$1.53.

On a weekly basis, the 1955 earnings figure in all manufacturing was \$63.34, or somewhat above the industrial composite of \$60.87. The former figure was well above earnings in the service industries, where wages are influenced by the high proportion of women employed (about 50% compared to 22% in manufacturing), by the unskilled nature of the work, and by the large number of part-time workers. Much the same factors contribute to the existence of a somewhat less pronounced differential between manufacturing and the trade and finance sectors. In contrast, manufacturing earnings were more than 10% below those in public utility operation and mining, in which a higher average level of skills is required; in mining, of course, there is also an element of danger pay as well as some compensation for working in remote areas. Weekly earnings in forestry were about 5% below those in manufacturing, presumably due to the part-time nature of some of the labour force in this occupation, while in construction and transportation weekly earnings were very similar to those in manufacturing.

While these figures help to put earnings in secondary manufacturing in broad perspective, as has been indicated, such over-all averages must be treated with caution because, due to supply factors, earnings in individual industries and regions in Canada vary widely. For example, labour immobility may contribute to regional earnings differentials by causing labour to be relatively more abundant in some areas than in others. Although the tremendous out-flow of manpower from marginal activities to more profitable occupations, the available data on the percentage of workers who change their jobs each year, and the statistics on inter-regional migration of families and labour all tend to support the view that labour mobility is generally high in Canada, the adjustment of labour to alternative job opportunities is neither speedy nor complete in all cases. This is particularly true in those areas characterized by subsistence fishing or agriculture, in small and isolated communities where wives or other dependents of men employed in a local industry account for a significant part of the labour force, and in regions dependent on a single industry for employment. In 1953, for instance, average weekly earnings in all activities by province ranged from \$45.64 in Prince Edward Island to \$65.79 in British Columbia, while by major cities the figures varied from \$49.64 in Halifax to \$71.86 in Windsor; comparisons between smaller communities show comparable differentials. By no means all of these differences are attributable to labour immobility, of course; in large part they reflect differences in the nature of employment and thus of the labour skills required in different regions.

The labour skills required in different types of manufacturing production, the relative unpleasantness, hardship, danger, or prestige involved in different jobs, the amount of overtime worked, the profitability of individual firms, the question of whether male or female labour is employed, and the extent of union organization, are some of the other obvious factors causing earnings in individual secondary industries and occupations to vary widely from the average, particularly in the short run. Thus in 1955 when the average of earnings in all manufacturing was about \$1.45, the figure in the petroleum products industry was \$1.96, in primary iron and steel and motor vehicles \$1.80, in agricultural implements \$1.67, in textiles \$1.12, in leather products \$1.02, and in clothing \$0.98. Within industries also, the figures ranged widely; compared to an average of \$1.51 in electrical apparatus and supplies, earnings in the heavy electrical machinery section of the industry were \$1.68, while in the radio and radio parts section, where a high proportion of relatively unskilled women are employed, the figure was \$1.33. Similarly, in the rubber footwear industry, earnings varied in 1954 from \$1.53 for certain types of cutting machine operations to \$1.06 and \$1.16 for women cementers in Quebec and Ontario respectively; these figures compare to the average in the rubber products industry at that time of \$1.45. These wide variations in earnings of course occur in other sectors also; for example, hourly earnings in metal mining in November 1956 were \$1.84 compared to \$1.50 in coal mining.

Over-all International Comparisons

Because labour is not a homogeneous commodity in any country and because earnings in individual industries and occupations vary widely, broad international wage comparisons must be used carefully. Regional variations are pronounced both in the United States and Canada and the labour skills required in similar industries in the two countries may not be precisely comparable because of differences in manufacturing techniques and equipment. Furthermore, statistical difficulties, particularly those relating to coverage and to variations in comprehensiveness over time, reduce the accuracy of international comparisons of earnings. Nevertheless, as long as these limitations are kept in mind, we believe the series shown in the statistical appendix are useful as an approximate measure of the magnitude of wage differentials between Canada and the United States and as a general indicator of major changes that have occurred in these differentials.

Table 35 indicates, as we have noted earlier, that in 1955 hourly earnings in all Canadian manufacturing were some 25% below those in the United States in dollar terms; this differential should be slightly reduced to take account of the small premium of the Canadian dollar in that year. It might also be noted that the partial evidence available suggests that if it had been possible to consider only secondary manufacturing, the differential might have been slightly greater than that shown for manufacturing as a whole. The

table indicates that this differential is now narrower than it was just before the war when it amounted to some 35%. This, of course, reflects the catching up of over-all Canadian productivity that has occurred since that time. The differential may have been abnormally high in the war and early postwar years due to a variety of factors including a greater degree of union organization in the United States at the beginning of the period and tighter and more prolonged wartime wage and price controls in Canada. In fact, when expressed in terms of domestic currencies, this differential does not appear to have changed noticeably from 1951 to 1956. It should be remembered, however, that in 1952 the Canadian exchange rate appreciated some 7% to an average level that was approximately the same as that of 1955 and not very different from that prevailing before the wartime devaluation in September 1939; a further appreciation of some 2% had occurred by the end of 1956. This change in the exchange rate has further reduced the differential in competitive terms and has reflected the mechanism of adjustment to changes in the level and composition of Canadian economic activity mentioned in Chapter 3.

In contrast to the experience vis-a-vis the United States, there is strong evidence that the wage and earnings differential between Canada and the overseas countries has widened noticeably since before the war, reflecting greater gains in Canadian total productivity per man-hour. Although no series is available for these countries as a group, and although the series for individual countries may be less than completely comparable, it is nevertheless possible to establish the broad pattern of manufacturing earnings in these countries since before the war. Thus in 1952 Canadian hourly earnings in manufacturing were more than three times their prewar level, while United Kingdom earnings expressed in Canadian dollars had about doubled to a level approximately one-third that of Canadian wages. In the same period, earnings in France and Switzerland had risen by some 80%, and those of Germany and the Netherlands had increased by less than 25%; the Canadian dollar equivalent of earnings in the latter two countries was about 40¢ an hour, while in the former two it was some 60¢ and 50¢ respectively in 1952. Comparable results are indicated by comparisons with other countries, the principal exception being Japan where earnings appear to have risen at a rate not very different from those in Canada, although in absolute terms they are only about one-seventh of those paid in this country. Such evidence as is available on earnings differentials with the overseas countries since 1952 suggests that changes in relative earnings since that time, particularly in Germany and the United Kingdom, have narrowed the wage differential somewhat, the earlier changes being principally the result of the postwar devaluations. These in turn, of course, reflected the sharp deterioration in the relative productivity of these countries that occurred as a result of the experience of the war and early postwar years.

In the foregoing, we have made no reference either to those fringe benefits not valued on a cash basis or to the differential in the salaries of office workers, technicians, and management. No complete statistics are available on either of these matters, although fringe benefits have been variously estimated at from 5% to 10% of wages in the United States. Even if the percentage is somewhat different in Canada, which is not certain, the difference surely amounts to a very little on balance, being only a fraction of a fraction. In the overseas countries, fringe benefits paid by employers directly or indirectly through taxes vary widely; in any event, in view of the smallness of any differences involved as compared to the large earnings differentials noted above, this question can be ignored without serious risk of distortion. As to salaries generally, such material as is available suggests that average differentials between Canada and other countries tend broadly to reflect differentials in wages and earnings although there is, of course, considerable variation in individual occupations—United States salaries for engineers, scientists, top-level management and other scarce professions, for example, being noticeably high in relation to those paid in Canada. On balance, then, it appears safe to assume that the earnings differentials discussed in preceding paragraphs would not be greatly affected one way or another if their coverage could be extended to include salaried workers and fringe benefits.

It might appear that this long-run trend of Canadian secondary industry earnings relative to those in the United States and other countries would have led to some worsening of the competitive position of our domestic manufacturers. In fact, however, abstracting from the special circumstances of the war and early postwar years and the abnormal experience of the depression, there has actually been a small decline in the share of the Canadian market claimed by imports. Once again this apparent paradox can be resolved by taking account of relative movements in the real productivity of secondary industry, and hence of changes in its comparative costs of production. In general, over-all Canadian productivity per man-hour has over the long run moved upward somewhat more rapidly than that in other countries, while real productivity in our secondary manufacturing industries as a whole has increased at an even faster rate. By surpassing the average Canadian gain in real productivity, the secondary industry sector has improved its ability to compete for, and obtain, its labour requirements in Canada despite some over-all decline in the effective protection afforded by tariffs.

It might be objected that an analysis in terms of real productivity is somewhat artificial in that money, wages and salaries in secondary industry and in Canada generally have clearly out-run the gains in physical output per man-hour since 1939. The inflation of prices since that time, however, has been a worldwide phenomenon and not peculiar to Canada alone. As Canadian domestic prices have risen by no more than those in other industrial countries, in many cases by much less, and as our exchange rate has actually appreciated somewhat, it cannot be argued that our comparative gains in real

productivity have been swept away by relatively greater inflation in Canada. It is true that our money costs of production have risen absolutely, but this does not alter the validity of our statement that the *relative* position of our secondary manufacturing has improved. The greater gains in our physical output per man-hour have meant that, taken as a whole, the prices of Canadian secondary manufacturers have risen by slightly less than those of other countries over the long run.⁵

International Unions and Canadian Wages

It is sometimes suggested that wages in Canadian secondary industry have in recent years been increasingly influenced by international trade unions with headquarters in the United States, particularly with respect to their attempts to achieve parity of Canadian and United States wages.⁶ A high proportion of secondary industry employees are members of international unions, particularly in organized industries such as steel, farm implements, and automobiles, while the percentage of union members who belong to international unions in Canada's 40 leading manufacturing industries is 85%. The principal exception in the secondary manufacturing sector is the textile industry in which a large proportion of the union members belong to national unions. However, these figures do not by themselves constitute evidence that international unions exert a different effect on Canadian wages than do purely national unions, and in general the Canadian local, and not international headquarters, determines union objectives with respect to wages and other goals of collective bargaining. There have, of course, been important exceptions in one or two secondary manufacturing industries, but although the staff and research facilities of American union headquarters are drawn upon for technical advice, most intervention by headquarters in Canadian bargaining processes seems to have had a bias towards restraint and moderation.

In general, both national and international unions behave in much the same way. There does not appear to be any special attempt by the latter to equalize the earnings differential between Canada and the United States, although this argument is frequently put forward by both types of unions with their bargaining demands. In the end, however, most collective agreements in secondary manufacturing are arrived at on the basis of more practical and immediate considerations such as the employer's ability to pay, general employment conditions in Canada, and wages paid in other Canadian regions and industries. If there had in fact been any attempt to narrow the earnings differential between Canadian and United States manufacturing by more than over-all Canadian productivity gains would allow, one would have expected

⁵We do not mean to underrate the problem of inflation and the important consequences it has on the ability to maintain stable economic conditions, and on the distribution of income between different classes of society. However, this question lies outside the scope of the present study.

⁶This subject is fully treated in Chapter 12 of the Commission's study *Canada-United States Economic Relations* from which most of the material in this section is drawn.

to find a greater degree of domestic inflation in Canada than in the United States through this period, relatively greater unemployment in Canada, or some combination of these two things. As noted above, this has not been the case.

This is not to say, however, that earnings in Canada are not influenced by our closeness to the United States in other ways than through international trade unions. Such influences are indeed felt, directly by stimulating emigration if earnings lag too far behind those to the south, and indirectly by making Canadians acutely aware of the higher pay available across the border. However, while there has been some emigration, particularly of engineers and other skilled personnel, the impact of these close tourist, personal, and business ties has been somewhat blunted by such diverse considerations as Canadian national consciousness, the United States military draft and security regulations, and the fact that the service elements of consumption, which are important to those in above-average income brackets, are more expensive in the United States than in Canada. In summary, while there are obvious pressures in Canada tending to raise Canadian wages in secondary manufacturing and other sectors towards the levels prevailing in the United States, there is not much evidence to support the view either that these pressures are particularly connected to international unions or that attempts to eliminate the differential have gone further than has been justified by productivity trends. Although union membership has been on the increase in Canada throughout the postwar period, this by itself appears to have been much less significant in its effects on the recent strength of labour demands in secondary industry than the high levels of employment in Canada, the generally tight labour supply, and the increasing output of the economy as a whole.

Non-wage Factors Affecting Overseas Competition

We have pointed out that the generally low productivity and high costs of manufacturing in the overseas countries have resulted in comparatively low levels of manufactured imports from these countries. Of course, other factors are also significant, including tariff protection. The rates applying to some of the more important labour-intensive products will be noted later in this chapter, but in general the MFN rates which apply to United States imports are also applicable to the products of other non-Commonwealth countries. The lower British Preferential tariff rate of course applies to all imports of Commonwealth manufacturers but, with a few exceptions, the main imports entering under this rate in the manufacturing field come from the United Kingdom.

Apart from tariff protection, the laid-down prices of many overseas imports in Canada are adversely affected by heavy transportation and shipping costs, due to the fact that the great distances involved more than offset the

comparative cheapness of ocean freight rates. This contrasts sharply with the position of competitors in the United States whose factories are often closer to regional Canadian markets than are those of Canadian producers. Only in coastal areas, and even then in only a few items like automobiles and certain types of steel, do overseas producers have an advantage in transportation costs as compared to the domestic producers located in central Canada. Perhaps more important than actual costs of transportation, however, are the delays and other handicaps associated with distance. Initially, orders take longer to fill, and inability to re-order rapidly may be an equally important drawback, particularly in consumer soft goods where it is important to maintain a full and complete line of merchandise. These difficulties may be overcome by the overseas manufacturer maintaining warehouses in Canada and providing the same service on orders as domestic manufacturers. However, this adds to the costs of doing business in this country and may even eliminate the differential advantage of overseas producers in manufacturing costs.

Similarly, the Canadian customer purchasing capital goods and some consumer durables normally expects to buy a "package" which includes not only the product itself but advice, design, servicing, and a ready supply of spare parts as well. As with consumer goods, the price of the product alone may appear cheap, but without easy servicing and without an adequate stock of replacements it may turn out to be very expensive, or, in extreme cases, useless; the postwar experience of many Canadians with such diverse overseas manufacturers as automobiles, agricultural implements, and industrial machinery is evidence of this. Some overseas manufacturers have countered these disadvantages by maintaining a qualified engineering staff and a number of parts depots in Canada, but this of course raises costs. In brief, favourable manufacturing costs alone do not allow overseas producers to compete effectively in the Canadian market. The provision of adequate stocks, servicing, and spare parts must also be included in the costs of doing business in this country; in this latter connection, the overseas producer is frequently at a considerable disadvantage because of his distance from the Canadian market or the smaller scale of his operations in Canada.

A third broad non-tariff factor which tends to protect the Canadian secondary manufacturer from overseas competition is the difference in quality and design between North American and overseas products. In many cases, reflecting the industrial leadership of the North American continent in a wide range of manufactured goods, Canadian and American machinery is simply more technologically advanced and gives superior performance; the combined effect of quality and price renders overseas production non-competitive. In other instances, overseas ignorance of Canadian requirements and designs effectively restricts sales in this country. For example, specification differences make some overseas products inconvenient to use in Canada; a classic case of this kind of obstacle to the purchase of machinery

was the difference between European and North American screw threads. Canadian safety standards may also restrict imports somewhat, as for example do the requirements with regard to the wiring of electric lamps. For still other products, Canadian designs, engineering skills, and expertise have enabled domestic producers to manufacture a product more suited to Canadian conditions than those available from overseas. Some types of pulp and paper and mining machinery, the portable scintillometer for mining exploration, and certain types of specialized electrical equipment are examples of such products. It is this fact which accounts for the relatively low level of imports from the low-wage countries in many labour-intensive products which call for a high degree of specialized labour, engineering, and designing skills.

Related to all the above factors is the strongly entrenched and assiduously cultivated taste of Canadian consumers and manufacturers for North American products. Some of this prejudice may no doubt be unwarranted and due to no more than the fact that constant use of North American machinery and equipment has led to unfamiliarity with overseas products, to which in turn poor advertising and selling methods by overseas manufacturers has in many cases contributed. It may also be due in part to a distrust of imported goods, although for certain consumer goods such as woollens, textiles, clothing, furniture, and some types of automobiles, the label "imported" may in fact enhance their standing in the eyes of consumers. However, despite these exceptions, it appears that the general failure of imports of machinery and other products from the low-wage countries to establish a stronger position in the Canadian market is due in the main to their inability to compete on a cost basis, taking into account not only price, but such other considerations as quality, design, service, and performance.

Competition for Labour

We turn now to a closer examination of the competition for labour between industries or segments of industries in recent years. As is true of broad sectors of the economy, individual industries with more favourable advantages of production in Canada have a substantial edge in the competitive struggle for man-power. This competition is of course modified by the existence of tariff protection, and comes from all industries in the economy. It will be recalled that an industry in which real output is rising relative to the national average is in a position to pay a little more than the going wage in order to obtain its labour requirements. This favourable situation may come about either because its physical production per man-hour is increasing comparatively quickly or because its output has become more valuable in the eyes of purchasers and the price it can command has therefore risen relative to that of other commodities. In either event, those industries which fail to keep pace in the productivity race will find that they are losing labour to the more efficient and rapidly growing industries. Ultimately they will be forced

to bring their wage rates up in order to retain their labour, but this can only be done by raising their costs. This leads either to lower profits or to higher prices which will expose them to increased import competition.

This process explains why the difficulties of a limited number of marginal secondary and other industries are intensified in times of buoyant economic conditions. The strong demand for export, investment, and many other products which accompanies a period of rapid growth such as Canada experienced in 1956 puts additional pressure on the wages of industries where demand and productivity is less favourable. This, together with strength in the exchange rate due to abnormally large capital inflows in such periods, is but a reflection of the increased advantages gained by devoting limited domestic resources to the more profitable and productive Canadian industries. Thus, the president of a large secondary manufacturing concern recently commented that the prosperity of the country in 1956 had both helped and hindered his industry; demand had been strong, but his costs of production, such as wages, had risen and the import share of the market had consequently increased. Conversely, if the demand for resources and labour eases somewhat, a combination of exchange rate adjustments, price changes and slackening of pressures on labour costs enables more marginal industries, both secondary and otherwise, to improve their share of the domestic market. This factor in part accounted for the growth of the textile industry in the '30's. The above analysis is, of course, more applicable to the short run, when the total of resources in the economy cannot be expanded without limit, than it is to rather longer periods. As was noted in Chapter 2, rapid growth of the Canadian economy, whether or not due in the first instance to an expansion of exports and derived investment, ultimately tends to attract additional capital, manpower and skills from outside the country and thus tends to lead to an increase in the size of the Canadian market. In turn this has traditionally enabled most, if not all, secondary industries to improve their relative costs and productivity in the long run.

Much of the competition and pressure on wages experienced by some of our less favourably placed secondary industries of course comes from other secondary industries with higher and more rapidly increasing productivity. Examples of such more highly productive industries are primary iron and steel, electrical equipment, and chemicals. Tables 36 and 37 show that these three industries have all experienced a narrowing of the wage differential with the United States, yet they have at the same time grown rapidly and improved their share of the Canadian market. The successful expansion of these and other secondary industries serves to illustrate that the very efficiency of most Canadian manufacturers in the use of complex production processes and modern machinery, and their willingness to adopt new techniques and products have combined to develop a high-productivity, high-wage secondary industry. This has caused low productivity, labour-intensive production to become increasingly expensive in this country, not only as compared to the

resource industries, but also to the other and more profitable opportunities available to Canadian labour and capital within the secondary manufacturing sector itself.

In fact, this process can be seen at work even within individual secondary industries; for example, the efficient mass production processes used by the largest part of the rubber industry have contributed to the raising of Canadian wages to a level that cannot be paid by the low productivity labour-using rubber footwear producers without incurring serious import competition. Similarly, the wages paid by the highly productive manufacturers of mass produced electrical appliances and equipment has had an adverse effect on the wages and costs of firms in the same industry which produce custom built electrical machinery by less mechanized processes. A comparable example is that of the highly capital-intensive chemical industry, which by bidding up the average price of Canadian labour, has contributed as much as anyone else to the competitive difficulties of one of its largest customers, the labour-intensive primary textile producers.

This perpetual competition of industries for labour is just another way of looking at price competition, and is thus a reflection of comparative production costs here and abroad, and of the ability of individual industries to compete with imports. As already noted, the process involves all sectors of the economy, including the rapidly expanding service industries, and has brought about a marked decline in the percentage of the population engaged in marginal agriculture, fishing, and other less productive activities in Canada. It is, in brief, the mechanism by which change and adjustment are brought about in a dynamic economy. The very existence of high-productivity, high-wage labour exerting constant pressure on costs has undoubtedly intensified this competition by impelling Canadian and American businessmen to improve their management techniques and to replace high cost labour by increasingly efficient production processes and machinery. However, this race for improved technology, with its accompanying upgrading of labour skills and wages throughout the economy, is essentially a symptom of the competitiveness and flexibility of business in Canada and the United States.

It seems clear that this process has not led to the existence of high cost labour in the often-quoted sense of all Canadian wages being "too high" to compete with production from other countries, but has rather led to the increased real productivity on which our rising standard of living is founded. Yet it is true that Canadian labour has become increasingly high cost to those secondary and other industries which have not kept pace with the rest of the economy in raising their productivity. Those secondary manufacturing industries most affected by this process in recent years have been those with relatively labour-intensive processes of production, because, as we have already noted, unmechanized labour is also unproductive and costly. Moreover, these labour-using industries have become increasingly vulnerable to

import competition because of the noticeable intensification of the pace of technological advance in other industries in recent years. This is the result of a double-edged effect. First, the higher proportion of manufacturing costs accounted for by labour costs in these industries causes any rise in wage-rates to have a greater proportionate effect on selling prices than in the more mechanized industries. Secondly, the very difficulty of mechanizing their production processes puts these high-labour content industries in an unfavourable position to utilize the rapid flow of technological discoveries and new machinery which tends to originate in the more capital-intensive industries.

The number of Canadian labour-intensive industries or branches of industries, is however, small. Moreover, this number is continuing to decline as more modern production methods gradually replace labour-using processes in these industries. This is indicated by the fact that imports from overseas countries amounted to only one-sixth of secondary manufactured imports in 1953, equivalent to some 3% of total consumption of secondary manufactured products in Canada; both figures are considerably below their 1929 levels. It should not, however, be thought that the failure of some secondary industries to mechanize their operations is necessarily due to a lack of effort to do so. The president of a large Canadian rubber company, for example, pointed out that extensive research and development work on mechanization of methods had been carried out in the rubber footwear industry for many years, but the manufacturing of parts for rubber footwear has proved very difficult to mechanize.⁷ He also pointed out that the scale of operations in Canada is much less of a factor in the relative costs of this industry than differentials in wages and labour costs, a natural corollary of the fact that labour-intensive processes do not lend themselves to economies of scale in the same way as do highly mechanized mass-production methods. It might be noted, however, that if the market for such labour-intensive products is large enough, as is true for example of certain types of textiles, machinery and footwear in the United States, it may be possible to apply entirely new production processes which reduce the high labour content of more traditional methods of manufacture. In some instances, therefore, the scale of operations in Canada contributes indirectly to the higher costs of production of labour-intensive industries and processes in this country by limiting their ability to become more capital-intensive. In such cases, import competition tends to come more from the United States than from overseas countries.

Individual Industries

Unfortunately, it was not possible within the confines of this study to undertake a comprehensive survey of the effect of wage changes and other cost factors on the competitive position of each individual labour-intensive industry. However, a few examples will perhaps help to clarify the broad

⁷Hearings, Toronto, February 3, 1956, p. 6236.

pattern of recent developments, and at the same time show the different influences that have been at work on individual industries and segments of industries. More information will be found in the various industry studies prepared for the Commission and in the briefs and testimony of witnesses. The problems of large segments of the Canadian primary textile industry in the postwar period serve to illustrate the difficulties in which labour-intensive industries have found themselves in this age of rapidly increasing mechanization. As can be seen from Table 38 earnings in the textile industry as a whole rose by 220% between 1939 and 1955, compared to 240% in manufacturing generally; similarly, the earnings differential with the United States in the same period was narrowed by slightly less in primary textiles than in all manufacturing. These increases in textile wages suggest that the mobility of labour in this industry is by no means as low as is commonly supposed. They also illustrate that no industry can long fail to keep pace with wage increases in other sectors of the economy if it is to retain its employees, particularly in view of the growing inflow of secondary and primary industries into towns where labour is in comparatively abundant supply. In at least one such case, that of the establishment of a new electronics industry in a small Ontario town, the higher wage rates it paid led to the immediate closing of the local textile factory, a perhaps rather extreme example of the impact of more technologically advanced operations on the prosperity of the less productive industries.

In any event, the position of many textile producers has worsened considerably since the late 1930's relative to that of secondary manufacturing generally. The industry has grown less rapidly, and the import share of the market, as measured from the abnormal circumstances of 1939, has risen by 50% compared to the 20% increase in the import share of all Canadian secondary manufacturing consumption in the same period. The decline in the import share of the Canadian textile market since the more comparable year of 1929 has been about the same as that for secondary manufacturing generally (see Table 34). This however, has been largely due to the striking fall in the import share of Canadian synthetic consumption since that year combined with the fact that synthetic fabrics now account for over one-quarter of domestic consumption as compared to less than 5% in 1929. The synthetic section of the industry is generally technologically advanced and fairly capital-intensive, (it is indeed like the chemical industry in most respects) and productivity gains in this sector appear to have kept pace with the national average, although some part of the long-run decline in the import share of the synthetic market has undoubtedly been due to an increase in tariff protection. As shown in Table 31 the key rate on synthetic fabrics is currently equivalent to about 38.5% ad valorem, as compared to some 35% in 1929.

In contrast, the cotton section of the textile industry has, due to a whole complex of factors, seen its share of the market decline noticeably since both

1929 and 1939. Above all, it is a very labour-intensive industry, with wage costs (excluding salaries) accounting for some 58% of its net value of production compared to 38% in all secondary manufacturing. Although the proportionate increase in hourly earnings has not been very different from the national average, this increase has not been matched by gains in productivity comparable with those registered in other industries. Moreover, although average Canadian earnings in the textile industry are still some 20% lower than in the United States, and although this differential has narrowed less since 1939 than in many other industries, the movement of large parts of the United States textile industry to the southern States has meant that for some producers the wage differential with the United States has been substantially reduced; for example, the wage rate for male weavers in 1954 was \$1.55 in New England and \$1.35 in the South. The importance of wage and cost trends in Canada and the United States is apparent from the fact that in 1953 some 80% of imports of cotton textiles came from the United States. By developing a more specialized and mechanized, although still comparatively labour-intensive, industry, United States producers have been able to reduce the labour content and raise the productivity of their operations faster than the Canadian industry with its smaller markets, shorter production runs, and more labour-intensive processes.

The Commission study of the primary textile industry indicates how smaller scale and less specialized operations contribute to labour-intensity and raise unit labour costs in the Canadian industry:

“The higher costs incurred by reason of short production runs arise directly from smaller workloads, costly changeovers and new set-ups, and indirectly from the added complexity and time involved in planning, supervision and management.”⁸

The submission of the industry itself also commented in this connection:

“In addition to a higher direct labour cost the multi-purpose plant operations which are forced on most Canadian industry also cause increased costs in other ways. In the textile industry this results in—

- (i) more variety of raw materials to stock, and control in standard of quality and fineness; greater variety of mill supplies;
- (ii) more frequent machine changes, and more resulting waste;
- (iii) extra checks and controls to supervise the variety of process stocks, and to maintain qualities;
- (iv) more management in production planning, sales organization and inventory and delivery control.”⁹

⁸Op. cit., p. 49.

⁹Submission of the Primary Textiles Institute, p. 18.

The Commission study provided an estimate of the additional labour time involved in processing four lots of two pieces of a worsted cloth as compared with one lot of eight pieces. The difference ranged from nil at one early stage up to 288% more time at a later stage of manufacture. An industry spokesman, in dealing with the same question, stated that the engraving of copper plates preparatory to setting up a run of cotton print goods costs the same amount regardless of the length of the run.¹⁰ Of course, factors other than manufacturing costs also give the American industry some edge in the Canadian market. These include style, design and variety, better selling and advertising techniques and, in some cases, faster delivery.¹¹

Because it is a labour-intensive industry, Canadian cotton textile production is also working under an increasing cost handicap in competing with a number of low-wage countries overseas. In fact, this industry is in a uniquely unfavourable competitive position in being exposed to growing competition from both the more mechanized United States industry and overseas countries. Although the share of United Kingdom imports in the Canadian market has fallen from 10% before the war to about 3% in 1952-54 and 2% in 1956, the share of imports from other countries, particularly Japan and India, has risen from approximately 3% of the market before the war. In the last few years the gains of these countries have been especially pronounced, although their share of the domestic market, at about 8-10% in 1956, still remains comparatively small in relation to American imports. Reliable data for Japanese textile wages in the prewar period are not available, but since 1945 the differential has remained broadly unchanged, with Canadian wages being some six to seven times those in Japan. However, the strikingly rapid modernization of the Japanese industry has enabled them to raise productivity at a much faster rate than was possible in Canada. Little is known of productivity and wages in the Indian textile industry but the rapid emergence of that country as a significant textile exporter suggests that it too has increased its output per man-hour at a rapid pace. On the other hand, the declining Canadian sales of the British cotton textile industry have taken place despite an increase in the wage differential in favour of Britain from 30% before the war to some 55% at the present time. This, together with available data on the physical productivity of the United Kingdom industry, confirms the failure of these producers to keep pace in improving their production methods.

Import competition has been felt more fully by the Canadian cotton textile industry than some other industries because of an appreciable decline in protection, even though there have been no significant reductions since 1939 in the provisions of the tariff schedule which apply to the main cotton textile imports, and even though most of these rates are actually higher than in 1929. This decline has been due principally to the effect of rising prices

¹⁰*Hearings*, Montreal, February 20, 1956, p. 6468.

¹¹*Ibid.*, p. 6490.

on the specific portion of the tariff and on its value bracket provisions. These latter provisions apply in the tariff item covering coloured cotton fabrics. The rate applying to imports from the United States is 25% and $3\frac{1}{2}\text{¢}$ a lb. if valued at less than 50¢ per pound, 22½% and 3¢ if between 50¢ and 80¢, and 17½% and 3¢, if valued at more than 80¢ per pound. Although the ad valorem rates are only 2½% below those prevailing in 1939, prices have about doubled since that time. Thus, to take a hypothetical example, a woven fabric valued at 49¢ in 1939 would have received tariff protection of some 17¢, or 34.7% ad valorem, whereas in 1955 the same fabric, then valued at 98¢, would have received a little more than 20¢, or some 20.6% ad valorem. In 1929 the comparable protection would have been 27.5%. In making the comparison with 1939, account must also be taken of the special valuation procedures and other administrative restrictions on imports employed throughout the 1930's.

The industry also claims that dumping, the selling of imported goods at prices below those prevailing in the country of origin, has increased in recent years. The anti-dumping provisions of the Canadian tariff are designed to deal with this practice, but the extent of trade between Canada and the United States makes it both difficult and expensive to prevent abuses in all cases. By the very nature of dumping, it is difficult for us to make a judgment about the extent to which it occurs, particularly as there is a tendency among some businessmen to treat all low-cost imports as dumping, even where no abuses have occurred. The textile study published for the Commission¹² suggests, however, that some dumping has undoubtedly taken place, especially in the high-volume mass-production lines, although a part of the increased import competition since 1951 has been due to the extremely competitive price and production conditions of the textile market in the United States.

Obviously, the experience of the cotton textile industry varies widely from product to product and firm to firm depending on the nature of the production process, the ability to mechanize operations, and the general efficiency of management and labour. Competition from the United States is concentrated in the specialized mass-production items such as towels, sheets, and coloured cotton fabrics and in a number of items where style and design are particularly important such as dress and curtain fabrics. From the United Kingdom imports are concentrated in cotton yarns, high-count fabrics, and certain clothing items such as gloves, socks, handkerchiefs, and undershirts, Indian and Japanese imports tend to be largely composed of standardized, unbranded products in which advertising is relatively unimportant, in the Indian case being mainly unbleached fabrics and cheaper types of coloured cloth. Our imports from Japan reflect the more advanced nature of their industry, being particularly pronounced in certain types of finished products including shirts, T-shirts, gloves, and similar products. In contrast, the Canadian industry has a much larger share of the market in certain industrial

¹²Op. cit., pp. 31-32.

textiles such as tire fabrics, in canvas products, and in a number of other volume operations such as certain types of standard yarn for which the Canadian market is large enough to support economic runs.

Major efforts have been made by the majority of firms in the Canadian industry to improve productivity, although because of the nature of their operations they have not always been successful. The cotton textile industry as a whole has consequently lost ground in the productivity race at a time when productivity and wages in other industries have been rising steadily. It is this fact which is at the root of their difficulties at the present time, both vis-a-vis the specialized mass production industry of the United States, and the well-managed and increasingly mechanized low-wage industries in some overseas countries, particularly Japan. The decline in protection as a result of price inflation has undoubtedly brought these competitive problems home with more force than would otherwise be the case, but it should be remembered that the ad valorem protection offered to this industry, at around 20%, is somewhat above the national average for secondary industry which is estimated to be in the vicinity of 15-18%. The relatively large share of competing imports would not therefore appear to be due essentially to the comparative degree of tariff protection, but rather to the unfavourable costs and productivity of the cotton textile industry as compared to other Canadian producers.

In contrast, competition in the labour-intensive Canadian woollen textile industry comes almost entirely from even less mechanized low-wage producers in the United Kingdom, who supply well over 90% of our imports; in this, as in some other labour-intensive industries, Canadian costs are generally well below those in the United States. The import share of the market at about one-third in 1953 was considerably larger than its 20% in 1939 although much lower than the 50% in 1929. Domestic output in 1955 was actually lower than it was in 1939, and even since 1929 the growth has been less than 50% compared to an increase of nearly 300% in secondary manufacturing as a whole.

The recent difficulties of the industry and the closing of a number of mills have been due to two basic factors. First there has been a relative fall in demand for wool fabrics in Canada, to which the development of new synthetic fabrics, the fall in the proportion of consumer incomes devoted to clothing and personal furnishings, and (as is widely believed in the clothing industry¹³) the styling and merchandising policy of the Canadian industry, have all contributed in some measure. In fact, in poundage terms total Canadian consumption of wool fabrics in the last five years has only been about 10% above its 1929 level.

The competitive cost position of the Canadian industry has also deteriorated because of the widening of the wage differential with the United

¹³See Reference No. 116—Report by the Tariff Board on the Canadian Wool-Cloth Industry, Ottawa, February, 1955, pp. 39-40

Kingdom. This widening appears to be no greater than that which has occurred in many other industries without serious effect, but the difficulty of mechanizing operations in the industry, despite the development of new weaving and spinning machines, has meant that Canadian productivity gains in the woollen industry have lagged behind those in other secondary industries. In addition, the financial position of many firms in the Canadian woollen textile industry has been seriously affected by inventory investments made at the time of the Korean War boom in raw wool prices; many firms underwent severe losses when the price of wool subsequently declined sharply. Naturally the competitive position of individual firms in the industry varies considerably, depending to a large extent on the products made, special Canadian skills, designing ability, and other factors. For example, the import share of the carpet market has increased significantly, while the level of imports of woollen blankets is low and declining. This is true despite the fact that the average tariff rates applying to imports of carpets, (B.P. 25% and MFN 35-40%) are considerably higher than those on blankets at around 22½-25%.

Changes in tariffs have not been significant in this industry in recent years, although the decline over the longer run has been substantial. The ad valorem equivalent of rates applicable to all wool imports was about 15% in 1948 and 1953, as compared to 22½% in 1929, over 40% in the early '30's, and about 30% in 1939. The change since 1939 has been due to the provision in the tariff schedule, dating from 1937, that maximum duties on woven fabrics shall be 50¢ a pound, a provision which the increased postwar price of woven fabrics has caused to be operative since 1948. Although effective protection has been broadly unchanged for nine years, it was only in 1952 that the import share of the woollen market began to rise sharply. In spite of the 1949 devaluation of sterling, it appears that the early postwar rush of consumers to re-stock on clothing, and the dislocation of British production acted to delay for some years the impact of the fundamental deterioration in the competitive position and markets of the Canadian woollen producers.

A third outstanding example of a labour-intensive operation is the Canadian rubber footwear industry; the difficulty of mechanizing segments of its operations and increasing its productivity has already been referred to. As Canadian wages have risen in response to the competition for labour from more mechanized Canadian industries, the rubber footwear producers have become increasingly vulnerable to competition from the relatively less mechanized, but extremely low-wage, industries of Hong Kong, India, and other countries. In consequence, imports of rubber-soled canvas footwear, which were negligible before 1949, rose to 705,000 pairs in 1953 and 2.5 million pairs in 1955, at which level they account for about 50% of the market in physical terms; in dollar values, because of the generally cheaper lines imported, they accounted for some 25% of the market in 1955. Four-

fifths of these imports came from Hong Kong, 15% from India, and the balance from other countries. In contrast, imports of waterproof rubber footwear, in which production is more mechanized and Canadian styles and quality are superior, have increased more slowly, accounting for only about 10% of domestic sales in 1955 as compared to less than 3% in 1935-39; in value, the 1955 import share of this market was some 5%. The United Kingdom accounts for about half of these imports, with the other main sources being Czechoslovakia and Hong Kong.

At the same time, exports of all types of rubber footwear, mainly to Commonwealth countries, which were substantial before the war and again in the special circumstances of 1946-47, have been virtually eliminated by rising costs, while Canadian consumption has risen by only one-eighth since 1939. The combined effect of falling exports, slowly rising domestic consumption, and the increase in imports, has brought about a reduction in total Canadian output from 20 million pairs in 1939 (24 million in 1947) to 13 million in 1955. The British Preferential rate on canvas shoes with rubber soles is 20%, the MFN rate applying to Hong Kong producers 27½%, and the general tariff 40%; on rubber boots and shoes the rates are Free, 22½%, and 25%. The level of protection applying to the great majority of imports of canvas shoes with rubber soles is much higher than the national average, while only for the British portion of rubber footwear imports is duty free entry granted. In any event, in the absence of recent changes in protection, the reason for the deterioration of the Canadian competitive position in this labour-intensive industry can only be the relatively rising costs which have accompanied wage increases unmatched by offsetting productivity gains.

Other labour-intensive industries which have been somewhat vulnerable to increasing competition because of rising labour costs and a relative lack of mechanization include segments of the clothing industry, portions of the leather footwear industry, some parts of the furniture industry, bicycle producers, and shipbuilding. However, in at least the first three cases, the natural protection associated with distance, transportation costs and other factors has combined with tariff protection to hold the import share of the market to low levels, although substantial imports of clothing and leather footwear are brought into the country by returning tourists. In the case of bicycles, in some measure because of its higher value/freight ratio and the large scale of English operations, these non-tariff factors have not operated, and although the preferential tariff remains at 20% the import share of the market is now some three times its 1929 level; the experience of certain toy manufacturers has been somewhat similar. Although apart from its tariff protection, shipbuilding has a substantial measure of additional protection from government purchasing of defence requirements in Canada, the industry obviously is not easy to mechanize. As a result a spokesman for the industry stated that higher Canadian wages cause Canadian costs of production to be

some 50% above those in the United Kingdom. This by no means exhausts the list of activities in Canadian secondary manufacturing which are relatively labour-intensive. Quite apart from such industries as ship-repairing, machine shops, and certain types of printing operations, which by their nature are of a local and semi-handicraft nature, there are a number of labour-intensive segments of otherwise mechanized industries. Included in this category are the assembling of electronic components, and the manufacture of some types of custom-built industrial and electrical machinery, in the latter of which the proportion of all labour costs to selling prices may be as high as 70%.

Imports of electronic equipment from the low-wage countries are relatively small, less than 8% of all imports, mainly because of differences in style and designs, although the protective effect of patents legislation and safety standards is also a factor. In the electrical equipment industry some 12-15% of all imports comes from countries other than the United States, but it is only in a few lines of heavy custom-built equipment that the low-wage countries' share of the market is noticeably above average. These products include steam turbo-generators, not at present made in Canada, certain types of large power transformers and parts, in which the total import share of the market in 1953 was less than 10%, some types of electric motors, and the heavier types of telegraph and telephone apparatus. In general, the import share of the market for most classes of equipment in the heavy equipment field has declined since 1929, although in recent years this result has been possible only because Canadian manufacturers have accepted sharply lower prices and profits. The Commission study notes also that with one exception, "much of the plant and equipment used by the two major firms for the production of heavy apparatus is old and in need of reconstruction".¹⁴ Tariff reductions do not appear to have been a major factor affecting the industry's competitive position with respect to heavy apparatus. Rates from the United Kingdom are about the same as in 1929, with the exception of reductions from 15% to 10% on telephone and telegraph apparatus, and the placing on the free list of steam turbo-generators not made in Canada. MFN rates applicable to most other low-wage countries have been reduced from 25% to 22½% for most types of heavy apparatus.

It should be emphasized that in many of the labour-intensive types of heavy electrical apparatus the high level of engineering, drafting, and labour skills required to build complex machinery confers an advantage on Canadian producers as compared to those overseas. Domestic manufacturers also have a wage and cost edge compared to the United States in many of these types of equipment. The ability to design to meet special Canadian requirements is an advantage, particularly in the production of such products as waterwheel generators which must be tailored to the requirements of an

¹⁴Op. cit., p. 46.

individual power site. Moreover, Canadian producers have succeeded in raising productivity in some labour-intensive operations by improving designs, materials and factory layouts. Other cost and quality advantages also enable domestic producers to compete effectively in the Canadian market, including the better servicing facilities which they offer to their customers, and the inconvenience of translating European specifications into the English language and Canadian units of measurement. Nevertheless, some rise in the relative manufacturing costs of domestic producers has undoubtedly occurred in certain lines of heavy electric equipment where the growth of the market has not been sufficient to permit more capital-intensive methods of production.

It is interesting to note that many labour-intensive industries are characterized by lower than average wages. In cotton textiles in 1955 hourly earnings were \$1.13, in leather boots and shoes, 98¢, in woollen cloth, \$1.05, in clothing 98¢, and in furniture \$1.17; these figures compared to a national average in manufacturing of about \$1.45. This reflects a number of factors mentioned earlier of which the most important are in our view the comparatively low level of skills required in these labour-intensive industries, and, in many cases, the high proportion of women employed. For example, as compared to 22% for all production workers in manufacturing, the proportion of women employed in the clothing industry is over 70%, while in leather products, and textiles (excluding synthetics) it exceeds 40%. A low level of wages by Canadian standards is therefore no guarantee that a labour-intensive industry in Canada can protect itself against foreign competition. Similarly, a relatively high level of wages, as in automobiles and primary iron and steel, may be perfectly consistent with a comparatively low level of competing imports. As already emphasized, the test of whether labour is high-cost or not is whether its productivity is proportional to its price. In the labour-intensive industries, lack of mechanization is reflected in unfavourable productivity and cost figures, so that even though the wage rates paid may be low compared to the average of those paid in other Canadian industries, relative productivity is still lower. The result is that these industries are high-cost in relation to other and more efficient industries, both inside and outside the secondary manufacturing sector.

This chapter has dealt mainly with the problems of the labour-intensive industries even though the general wage analysis it contains applies equally to all secondary manufacturing activities. We would not wish this method of approach to imply that the question of wages is unimportant for the larger group of secondary industries in which production processes are more capital-intensive and in which productivity is usually sufficiently high in relation to the overseas countries to offset the Canadian wage disadvantage. In competing with the United States, the main source of import competition, these industries of course find that our lower level of wages reduces the handicaps incurred in producing for our relatively small market. Never-

theless, as we have pointed out, the 25% gap in wages is less than the average difference in productivity between secondary manufacturing in the two countries, a fact which causes unit labour costs to be higher in Canada. This in turn makes most of our secondary industries dependent to some extent on tariff protection. Within this framework, the majority of our domestic manufacturing industries have been improving their competitive position relative to the United States over the long run despite the fact that the narrowing of the wage differential with that country has obviously affected them in the same way as it has affected the more labour-intensive industries. As noted earlier, the explanation lies in the relatively rapid improvement in the productivity of most of the more mechanized industries, an improvement deriving in large measure from such factors as the growth of the domestic market and the development of more specialized and capital-intensive production processes. These factors having outweighed the effects of wage changes in such industries, we believed it more useful to concentrate our main attention on the less capital-intensive industries where the reverse has been the case.

Other Factors Affecting Labour Costs in Canada

In discussing wages and labour costs in Canadian secondary industry, it is relevant to consider whether Canadian labour is more or less effective than that in other countries with respect to effort and ability. We have already noted that there are differences in the productivity of secondary manufacturing between countries due to differences in mechanization, production processes, and the size of markets. We must now ask whether any of this productivity differential is related to variations in labour attitudes and effectiveness between countries, i.e. whether labour productivity in Canada and other countries would continue to be somewhat different even if all other factors were equal except for the quality of labour itself. With respect to most of the overseas countries, it is generally agreed that Canadian labour is more skilled in mass production methods, harder-working, responds better to increased material incentives, and is more willing to accept new techniques and production methods. There are exceptions to this, of course, particularly in the case of certain specialized handicraft skills which have been developed over the course of many years in European countries, but we would not hesitate to commit ourselves to the general proposition that the quality, effort, and attitudes of Canadian labour confer a significant advantage on our secondary manufacturing producers relative to those in overseas countries as a whole.

To the question of whether American and Canadian labour productivity would be equal under comparable conditions of production, the conflicting testimony of Canadian businessmen and the inconclusive results of a number of surveys suggest no firm answers. We have heard opinions ranging from "Canadian secondary industry labour is intrinsically 25% less productive than American because it is less materialistic and driving", to "Canadian labour

is considerably more productive because it co-operates better with management". However, the great majority of opinion seems to be that in general the Canadian worker would not greatly differ from his American counterpart under equal production, machinery, and marketing conditions. This conclusion would appear to be substantiated by a survey carried out in 1954 by John H. Young.¹⁵ Of 151 American manufacturing firms with subsidiaries in Canada who answered a question on this same subject, 45 thought their American labour force more efficient, 98 thought that there was no difference, and 35 believed that their Canadian work force was inherently more efficient. Allowing for the relative smallness of the sample, the almost equally balanced pattern of replies suggests that in manufacturing as a whole the difference in favour of American labour, if it exists at all, cannot be very great, with the widely differing experiences of individual firms about cancelling each other out.

Mr. Young noted that there was considerable similarity in the reasons given by firms for preferring either their Canadian or American labour force. Those who thought the Canadian labour force less effective tended to stress their comparative lack of industrial experience, their less complete response to increased incentives, their lower valuation of money and material things, and their slower pace of work. On the other hand, those who thought their Canadian work force more efficient tended to stress the more co-operative attitude of Canadian workers and the comparative lack of union restrictions and interference; in general, they held the view that Canadian labour was less "spoiled or pampered",¹⁶ and that while Canadians may work more slowly, they also work more consistently. The great majority of replies, however, indicate that there is no significant difference between workers in the two countries with typical replies being:

"... as much variation in attitude and effectiveness in Canada from one work force to another as in the United States";

"The application of effort is considered about equal";

"The man determines the effort and not the nationality";

"There are no noticeable differences in efficiency or effectiveness between our Canadian and United States plants on the average. There are, however, a number of United States plants less efficient than our Canadian plants, as well as a few which are more efficient".¹⁷

It seems clear on the basis of such evidence that the difference between the inherent ability and effort of the Canadian and American manufacturing labour forces cannot in general be very great, if differences in plant, equip-

¹⁵John H. Young, *Some Aspects of Canadian Economic Development*, Chapter V. Unpublished Ph.D. thesis, Cambridge University (England), January, 1955.

¹⁶*Ibid.*, p. 73.

¹⁷*Ibid.*, pp. 73-74.

ment, and other factors are left aside. Even after allowing for what might be nothing more substantial than anti-union bias in some of the replies, one cannot feel that differences in labour attitudes per se are much of a factor in the broad over-all difference between Canadian and American secondary manufacturing costs, although in particular cases bad labour-management relations, inter-union rivalries, or other influences may cause the difference between Canadian and American plants to be quite pronounced in either direction. If it suggests anything, such material as we have seen may suggest that American manufacturers may have a very slight cost edge over their Canadian counterparts because of the greater materialism and drive of the American labour force.

One other factor which may be thought to have had a slight bearing on cost differences in the two countries in recent years has been the relative shortening of the Canadian work week. It will be seen from Table 35 that the work week in Canadian manufacturing in 1955 was 41.0 hours as against 40.7 in the United States, a difference so small as to be well within the statistical margins of error. Although the statistics are less comparable for 1939, they indicate that the Canadian work week was some 20% longer than in the United States in that year. The virtual elimination of this difference in the last 15 years would not have raised total labour costs,¹⁸ but might have affected overhead costs somewhat by causing plant and equipment to stand idle for longer periods each week. This would not be an important factor in industries where the number of shifts has been increased or in which a multi-shift operation has been carried out in both periods. While we have not pursued this matter in any detail, nobody has suggested to us that the relative reduction of the Canadian work week should seriously be considered as a factor affecting the relative costs of Canadian and American manufacturing in recent years.

¹⁸Abstracting from changes in productivity, which have reduced the number of man-hours necessary to produce a given amount of output, total labour costs are the same if ten men are paid for 40 hours a week or 8 men for 50 hours.

OTHER COMPETITIVE FACTORS

IN THE PRECEDING chapters we discussed two important factors which affect the competitive position of Canadian secondary industry: the smaller size of the Canadian market which prevents most Canadian producers from obtaining the same economies of scale and specialization as their competitors in the United States, and the level of Canadian wages which gives low-wage overseas producers some advantage in competing with a comparatively few labour-intensive Canadian industries. In this chapter we propose to assess the effects of a wide range of other factors on the cost and competitive position of Canadian producers. Some of these factors, of course, are in part related to or derived from the smaller size of our market but it was found more convenient to deal with them here rather than in Chapter 4.

Cost of Materials and Machinery

Canadian manufacturers appear to pay about the same prices for most raw or unprocessed materials as their competitors in the United States. This is particularly true for indigenous materials such as copper, lead and zinc; for these metals Canadian prices are usually no higher than American, and in others such as aluminum, Canadian producers have a positive cost advantage. However, the president of a fine paper company said that Canadian fine and specialty paper manufacturers on the whole paid more for pulpwood than their competitors in the southern United States, due mainly to higher freight costs. On imported raw materials such as cotton, wool, tin and natural rubber, which in most instances enter Canada duty free, Canadian manufacturers generally pay about the same prices as their United States competitors. The fact that the United States in a few instances protects domestic producers of raw materials tends to raise costs to the American manufacturer and gives Canadian manufacturers who can buy from other sources a slight competitive advantage. Although Canadian secondary industries generally pay somewhat less for electric power, costs of coal and petroleum are somewhat higher in Canada than in the United States; Canadian consumers are on the average farther from the source of supply, and there is a duty of \$0.50 per

ton levied on bituminous coal imported into Canada. Nevertheless, except in a few industries where fuel is an important raw material the difference in fuel costs is not a significant handicap. In fact, in the most important fuel-using secondary industry, primary iron and steel, coal imported for coking purposes is permitted duty free entry, and a subsidy of \$0.495 per ton is granted to Canadian steel producers using domestic coal for the same purpose. Little is known about relative prices of fuel and raw materials in Canada and in the overseas countries, but what evidence there is suggests that Canadian producers are certainly not under any cost handicap in this respect.

In contrast to the price paid for raw materials, Canadian prices of manufactured parts and materials are often considerably higher than in the United States. This price differential is essentially a reflection of the higher costs of manufacturing in Canada and of the tariff on imports of many manufactured goods. The amount of the cost differential for any given product will therefore be closely related to the cost disadvantages of producing it in Canada, whether due to scale, specialization, wages or other reasons, and to the tariff levied on it. We have already cited many examples of these higher costs of manufactured products and of relevant tariff rates. In fact, in some industries such as automobile production the cost disadvantages may be due as much to the cost of parts as to cost disadvantages at the assembly or final production level. Industries most affected by the higher costs of manufactured components naturally tend to be those with a relatively high proportion of such parts in the final product, in particular the durable goods industries including automobiles, electrical equipment, machinery, and iron and steel fabrication. In this connection the president of Montreal Locomotive Works stated that selling prices in Canada are 12% to 15% higher than in the United States. This is due in part to the relative size of the two markets, but is also attributable to higher material costs. He went on to say:

"... materials and components which are not made in Canada must be imported from the United States. They include steel in forms not rolled in Canada or in quantities not obtainable in Canada during periods of high activity in the mills. They also include components whose manufacture in Canada presumably is not justified by the size of the market. Nevertheless, with the exception of diesel engine components, which may be imported duty free under Section 442-D if of class or kind not made in Canada, full duty must be paid. This duty is an appreciable factor in locomotive cost and will become greater if import duties on steel, particularly on types not produced in Canada, are increased. Locomotive costs and prices could be reduced if components and materials, production of which in Canada is clearly uneconomic, could be imported duty free."¹

¹Hearings, Montreal, January 20, 1956, p. 3983.

Of course, this handicap is reduced to the extent that parts are admitted duty free or at low rates because they are not made in Canada, because end-use exemptions apply, or because duty drawbacks are granted on materials used for manufacturing goods to be exported. The agricultural machinery industry, for example, is able to bring in its components free of duty (there is also duty free entry on finished machinery), and is therefore at no significant disadvantage on this score. Many other industries including automobiles, electrical equipment and chemicals may bring in many parts or components not made in Canada at low or free rates of duty. In general the tariff on fabricated materials or parts is the same as, or lower than, on finished products. The competitive disadvantage of the Canadian manufacturer in importing parts over the tariff, or in buying higher-cost Canadian parts produced behind tariff protection, is thus more than compensated for by the protection he receives on the finished product. In fact, to the extent that tariff protection on finished products is higher than on parts, the effective rate of protection for the Canadian manufacturer is increased. For example, if a product is assembled in Canada from imported parts carrying a 10% duty, with the parts forming half of the value of the finished product, and the duty on the finished product is 20%, then the effective rate of protection is actually 30%.² However, it was stated by one representative of the dress industry that a manufacturer importing wool, textiles and rayon fabrics for dresses paid duty up to one-fifth higher than is assessed against finished dresses made up of the same materials.³

In summary, in purchasing raw and unprocessed materials, and fabricated products which are imported duty free or which can be manufactured as cheaply in Canada as in the United States, Canadian secondary industry as a whole appears to be at no net cost disadvantage. However, in buying the somewhat larger group of materials manufactured at a higher cost in Canada or imported over the tariff, Canadian producers appear to pay an average premium of about 10% to 15% (see Table 49). While we have no detailed statistics on the proportion of total material inputs that this latter category represents, we estimate that the costs of all types of materials combined may be 5% to 10% higher to Canadian than to American producers. As purchased materials are equivalent to about half the gross value of secondary industry production, and as some allowance must be made for the element of double counting in the statistics (final products of one industry shown as material used in another), these higher material costs are probably responsible for no more than between two and four percentage points of the cost differential between Canadian and American secondary industry. Much of

²If the final product sells for \$2.00 in the United States, and protection is 20% in Canada, the theoretical maximum price which can be charged in this country without incurring import competition is just under \$2.40. If the parts which cost \$1.00 in the United States cost \$1.10 in Canada, the Canadian producer may charge up to \$1.30 for the value added by manufacturing compared to \$1.00 charged by the American producer.

³*Hearings*, Montreal, January 20, 1956, p. 4079.

this cost handicap, of course, is properly attributable to the diseconomies of the smaller size of our market.

Costs of machinery in Canada are affected by the same broad considerations. As mentioned earlier, in recent years about two-thirds of Canadian machinery requirements have been imported. The present tariff rates are (a) for machinery of a class or kind made in Canada, British Preference 10%, MFN 22½%; and (b) for machinery of a class or kind *not* made in Canada, B.P. free, MFN 7½%. Moreover, in many cases end-use exemptions, drawbacks, and special orders-in-council enable machinery to be imported duty free. In fact the actual duty collected has been around 10% of the total value of machinery imports although costs of machinery actually produced in Canada are estimated generally to be between 10% to 20% higher than in the United States. Taken together, all these factors suggest that the net disadvantage of Canadian producers in buying machinery are of the order of 10% to 15%. Since annual depreciation charges on machinery are in most industries a considerably smaller element of costs than the purchase of manufactured components, this factor, while of some importance particularly in capital-intensive industries, is much less significant in its effect on costs than the higher prices Canadian manufacturers must pay for materials.

Transportation and Distribution

It is suggested frequently that it costs Canadian manufacturers more than American manufacturers to ship and distribute their goods; their market is not only much smaller but distributed along a narrow strip of land across the continent. It must be emphasized first that on a ton-mile basis Canadian freight charges do not appear to be greatly different from those prevailing in the United States, although the complexity of freight rate structures causes rates on individual products to vary widely. However, lower productivity in the Canadian transportation system, for which the geography of the country is undoubtedly in considerable part responsible, appears to be roughly offset by lower wages on the average. Nevertheless, in some industries transportation costs, as contrasted to freight rates, are higher in Canada. For many products, demand in Canada is large enough to support only one or two plants located near the centre of the main Canadian market. The United States market, on the other hand, is of sufficient size to absorb the output of a larger number of plants dispersed around the country. Even if Canadian plants were as large, as specialized and as efficient as the American, the greater decentralization permitted by the larger United States market would mean lower freight costs to market for the American producer.

In effect, the choice facing Canadian producers is whether to decentralize to achieve lower transportation costs at some loss in productive efficiency, or to accept higher freight costs and maximize the economies of scale by concentrating production in one central plant. How the dilemma is normally

resolved will depend upon a number of considerations, the most important of which appear to be the nature of the product and the extent of the penalty for operating a plant below optimum size. Where the product is expensive to ship in relation to its value, or where economies of scale are not important, production is much more likely to be decentralized than in those industries where economies of scale are great and freight costs relatively less important. This may be illustrated by a brief examination of the position of some of the more important secondary industries. The automotive industry, including assembly and the manufacture of parts, is largely concentrated in Ontario between Windsor and Oshawa. Although freight costs are substantial—it costs \$250 to ship an automobile from Windsor to the West Coast—scale is so important a cost factor that decentralization of production is simply not feasible. In the United States there is a concentration around Detroit in the manufacture of many complex component parts, but assembly of automobiles is carried out not only in the Detroit area but in many plants scattered across the country. Consequently, the freight component in a Canadian automobile shipped to Vancouver is higher than on the same automobile sold across the border in the state of Washington, and appreciably more than the freight costs on automobiles brought in by ship from overseas. To offset some of this freight disadvantage Canadian manufacturers absorb as much as \$100 of freight costs per automobile, but a subsidy of this kind, while it makes Canadian automobiles more competitive in British Columbia with imported vehicles, adversely affects the manufacturers' over-all competitive position.

The study of the Canadian primary iron and steel industry refers to the same problem:

"Because of the location of the Canadian mills and the great distances over which the Canadian market is spread, comparative freight costs bulk especially large in this country . . . in western Canada the advantage is on the side of the U.S. mills . . . the U.S. steel mills which compete with (Canadian producers) are strung out at various points across the country . . . cheap ocean freight rates give overseas exporters an advantage over the Canadian producers in reaching areas within a certain radius of both the Atlantic and Pacific seaboard."⁴

The handicap is reduced somewhat by competitive rates—"agreed charges"—obtained from the railways, although these rates are never set by the railway below the point that "does not return its operating costs and something more". To take the most extreme case shown in the study, the freight rate on bars from Seattle to Vancouver is \$0.23 per cwt. whereas it is \$1.10 from Hamilton. However, it might be noted that the base price of bars of \$4.80 at Hamilton is \$0.60 below that at Seattle. More typical cases suggest that

the freight differential to western Canadian points ranges on the average from 10% to 15% higher, which expressed as a percentage of final selling prices may be of the order of 2% or 3%.

These two industries—the automotive, and the primary iron and steel—are not, of course, representative of secondary industry as a whole. In spite of the fact that their products are heavy and bulky, with freight costs relatively high in relation to value, the large size of technical units in each industry and the importance of economies of scale greatly outweigh the reduction in transportation costs which would result from more decentralized production. In some other secondary industries the economies of scale, while perhaps not so great as in automobiles or iron and steel, are usually more than enough to lead to a similar concentration of production in Ontario and Quebec. In this category are tobacco products, some types of clothing, textile and electrical products, rubber products and some secondary chemicals. Finally there are industries where the ratio of freight to value is high and either regional markets are large enough to support a reasonably efficient plant or the penalties of smaller scale operations are not severe. This group includes brewing, meat packing, furniture manufacturing and oil refining; plants in these industries tend to be distributed across the country more or less on the pattern of the population. However, even where decentralization of Canadian production has taken place, there may still be areas where imported goods have an appreciable advantage due to freight costs. It was stated at the hearings by a spokesman for a large Canadian building products company that, although there are plants manufacturing roofing material in Toronto and Winnipeg which compete successfully in these centres with imports, freight costs at the intermediate city of Fort William are such that Canadian producers are being priced out of that market.⁵

It must be emphasized, however, that those Canadian industries which are not decentralized and which are adversely affected by freight costs at the extremities of Canada, have a considerable freight advantage in the central Canadian market. With Ontario and Quebec forming the principal market for secondary industry output, and having 62% of the population, 67% of personal income, and 87% of secondary manufacturing, this is obviously of considerable importance in giving Canadian manufacturers a cost advantage over competing imports. The primary iron and steel study stated in this connection that in most sections of the big central Canadian market, with the exception of southwestern Ontario, competing United States mills have a freight disadvantage that helps to limit import competition significantly in that region.⁶ In the automobile industry the freight advantage in central Canada is not particularly significant insofar as United States competition is concerned, but it does improve considerably the competitive position of Canadian producers with respect to overseas producers. This is in contrast to

⁵Hearings, Montreal, February 23, 1956, p. 7034.

⁶Op. cit., pp. 14, 15, 25.

the position on the two coasts. In many other bulky or perishable products, such as cement blocks or bread, freight costs not only provide the manufacturer with protection from foreign imports but protection from goods from other regions of Canada, although at the same time they restrict him to his local market. Rising freight rates may thus have unfortunate consequences for some regional producers. At the hearings reference was made to a Nova Scotia company that manufactured wall plaster and in 1948 was able to compete in the Toronto market in spite of a freight disadvantage of some \$4 per ton compared with the Ontario plaster.⁷ In the following eight years freight rates approximately doubled; the new \$8 freight differential could not possibly be absorbed by the Maritime manufacturer and he was completely forced out of the Toronto market.

It is difficult to conclude on balance that higher costs of transportation of either materials or finished goods are a serious handicap for Canadian secondary industry as a whole. Certainly for a number of industries in some regional markets in Canada, freight rates and transportation costs may give the foreign competitor an edge, but the same factor often effectively protects the Canadian producers' main markets from foreign competition. It would also appear that distribution, warehousing and selling costs are no higher generally in Canada than in the United States, although one witness suggested that Canadian costs of distribution have been increasing more rapidly than those in the United States since the war, largely because of a narrowing wage differential. Our greater distances, lower population density, two-language market and less specialized marketing and distributing facilities may cause the proportion of our manpower absorbed in distribution to be somewhat higher than in the United States, but it should be emphasized that a large part of the Canadian market for the products of secondary industry is located in an urban, fairly thickly populated region close to the centre of industrial production. The distribution, servicing and selling of manufactured goods would not appear to be greatly different in Montreal or Toronto than in Buffalo or Boston. Even more important, the distribution of goods tends to be fairly labour-intensive, and wages remain considerably lower in Canada than in the United States. As the head of one of Canada's largest food chains pointed out:

"Today, labour costs are by far the most important single item in the operating expenses of chain food stores. In the United States, payroll expenses of the average chain usually exceed 9% of sales . . . It was 9.63% in the second quarter of 1955. Among Canadian food chains, wages and salaries generally constitute between 7% and 8% of the total sales."⁸

Insofar as distribution costs are reflected in wholesalers' and retailers' margin, the Commission's study of the service industries suggests that there

⁷Hearings, Ottawa, March 2, 1956, p. 8233.

⁸Hearings, Montreal, February 21, 1956, pp. 6632-3.

is little to choose between the two countries. Gross margins on a percentage basis tend to be higher in the United States, but net profits in that country appear to be lower than in Canada, at least at the wholesaling level. It is true that prices of secondary products in Canada are on the average higher than United States prices, and this may mean a slightly higher unit expenditure in terms of dollars, but a small differential of this order lies within the margins of error of the data. In summary, we find it difficult to conclude that costs of distribution and selling are higher in Canada than in the United States, or that this factor affects the relative position of Canadian secondary industry as a whole.

Climate, Construction Costs and Seasonality

It has been suggested by some manufacturers that the severity of the Canadian winter raises costs in Canada. The president of Canadian Car and Foundry said in his testimony:

“The cost of heating alone, bearing in mind the type of buildings used, gives the United States competitors a definite advantage; climatic conditions are an important factor in increasing overhead costs, in addition to adding to the costs of the original buildings.”⁹

On a particularly cold winter day it is easy to be persuaded that this argument has some validity. Yet on closer examination it does not appear that for secondary industry as a whole the Canadian climate markedly affects costs relative to those in the United States. In the first place, much of the competing secondary industry in the United States lies in northern latitudes of that country where the winters, if in most areas not quite so long as in Toronto or Montreal, are subject to similar extremes of cold and frequency of snow and sleet storms. Although heating costs are somewhat higher in Canada, the construction and insulation requirements of factory buildings in the two countries are much the same. Moreover, American summers, even in the northern industrial belt, tend to be longer, hotter and more humid than the average for Canadian industrial centres, and this also has implications for costs and labour productivity. The interruptions to work caused by heat waves, and the need for air conditioning to make summer employment tolerable, may well be as great a cost handicap as cold weather. These conditions of course, also affect Canadian producers although to a lesser extent.

Construction costs in the two countries do not appear to be greatly different. The Commission's study of the construction industry undertook some cost comparisons and, while the evidence was not conclusive, it suggested that the lower cost of building materials and less marked seasonal fluctuations in the United States tend to be offset by the lower level of Canadian wages. The effect of the Canadian weather on construction activity in Canada, however, does appear to have some cost implications for producers

⁹Hearings, Montreal, January 20, 1956, p. 4000.

of buildings materials. Table 39 compares construction employment in Canada and the United States in 1955 and 1956 on a month by month basis. Although differing economic trends in both countries may have some slight distortive effect on the seasonal pattern, the table reveals a much sharper decline in winter construction activity in Canada; employment in the low activity months in Canada is nearly 40% below the high, compared to 22% below the high in the United States. The table also shows the comparative production pattern for three representative building products, brick, gypsum lath and paint. Variations in Canadian production are much greater than in the United States; such building materials are bulky and difficult to stockpile, and output must be linked fairly closely to construction industry demand. These sharper seasonal swings, of course, tend to raise production costs in Canada relative to those in the United States. Other secondary industries which may be similarly affected, although probably not to the same degree, include structural steel, steel pipe, plumbing and hardware supplies. However, there appears to have been some reduction recently in the amplitude of the seasonal variations due to improvements in building techniques. The president of Dominion Bridge Company said that the seasonal fluctuations in the activities of his firm had been greatly reduced over the past few decades:

"It might be supposed that a lot of time is lost during the winter but actually in the latitude of Montreal the percentage of days lost by our erectors due to cold and snow is not much higher than that lost during the summer due to rain and wind. The ability to maintain a year around erection force adds to the economy of operations by cutting overhead and other costs."¹⁰

On balance, it would appear that only the relative costs of manufacturing building materials, where production must be closely geared to demand, are affected appreciably by the seasonal swings in construction. As already indicated these industries are to some extent protected against imports in their local markets by heavy transportation costs on their products.

Most secondary industries in Canada and the United States of course experience seasonal variations in production. Indices of monthly employment in some secondary industries are given in Table 40. The fluctuations which occur reflect the fact that most buying by consumers or farmers, whether for clothing, automobiles, rubber footwear, combines or tractors, tends to be seasonal in nature. As the president of RCA Victor of Canada pointed out, a seasonal pattern even applies to television sets:

"One serious problem I would like to mention here as a problem to which we have no solution and neither has the industry found a solution, is due to the Canadian consumer's insistence on purchasing some 57% of his television in the last four months of each year.

(Over the past five years Canadians have purchased 69% of their TV receivers in the last half of the year.) The production curve goes up sharply from August to December—then drops off gradually until April—with often a pronounced dip in the months of May, June and into July. To meet this seasonal demand many of the hourly workers employed on production of television receivers in the fall months cannot be kept in employment in the spring and early summer. When laid off a substantial number find other work and when the heavy demand commences again in the late summer a new group must be hired and trained.”¹¹

However, he went on to say that the American buying pattern is somewhat similar, if perhaps not so extreme. The fact that in Canada spring and summer arrive later than in the United States, and do not last as long, has been mentioned as a competitive handicap by some manufacturers, particularly those in the clothing industry. It is argued that the American manufacturer of summer dresses not only has a year round market available in some part of the United States, but the earlier introduction of new models in the United States enables him to hit the later peak of the Canadian market with end-of-line clearance sales. These sales may not be dumping as officially defined, since the goods are offered on the same basis in the United States as well as in Canada, but they do provide serious competition for the Canadian producer. This problem has however been recognized in the recent amendment to the Customs Act which provides that valuation of end-of-line clearances for duty purposes will be based on average prices prevailing over the previous six months.

Looking at secondary industry as a whole, the adverse effects of climate, construction costs, and seasonality do not appear very serious. Apart from the producers of building materials, and possibly some kinds of clothing, the Canadian and American manufacturers are exposed to very similar conditions. Nevertheless, although climate may not have much of a direct impact on relative production costs in Canadian secondary industry, its impact on the Canadian consumer is considerable. Home heating and winter clothing costs and snow-removal taxes are all somewhat higher in Canada. These costs, however, do not enter into the manufacturer's calculations, unless they compel him to pay higher wages to counter the lure of the warmer climate to the south. If this is a factor in some industries we have no way of measuring it, apart from noting that some companies reported losing engineers and technicians to Florida and California as much for the attraction of the climate as for the salary differential.

Legislation and Taxes

It has been suggested that certain provincial restrictions on hours of work and the employment of women on night shifts may have some slight

¹¹Hearings, Montreal, February 24, 1956, pp. 7155, 7159.

effect in raising the costs of Canadian textile manufacturers relative to those in the United States. While clearly not a significant factor, it is difficult to measure its impact precisely, particularly as many Canadian textile plants are now operating below capacity. However, in such a labour-intensive industry, the effect of using the factory for slightly fewer hours per week is probably much less of a handicap than in more capital-intensive industries. The president of one company suggested it was of some importance in the fine paper industry. He said that the American mills can operate seven days a week whereas Canadian producers "are prevented from working more than six days per week by provincial legislation or by lack of union agreement".¹² However, these limitations would only appear significant when companies affected by the restrictions are operating at capacity; apparently this has seldom been the case in the fine and specialty papers industry. In contrast, the newsprint industry in Quebec and Ontario, which has been operating at capacity for nearly a decade, is affected much more by the limitation of the six day week. There appear to be few other instances in which differences between the two countries in legislation affecting conditions of work have a measurable effect on relative costs.

Tax differences are sometimes cited as a factor which prejudices the competitive position of the Canadian producer.¹³ With respect to corporation income taxes, Canadian manufacturers have an advantage at the present time, with the effective rate on all but a minimum business income at 47% (now 49% in Ontario) compared with 52% in the United States. Moreover, material contained in the Commission's study of taxation suggests that the net effect of state corporation taxes and social security contributions, the latter of which are included in the corporation tax rate in Canada, serves to widen the differential by some five percentage points.¹⁴ Other provincial, state and municipal taxation varies from locality to locality and although no general conclusions may be drawn about the relative position of Canadian industry as a whole with respect to these taxes, no significant differences were brought to our attention. Canadian sales and excise taxes are applicable to imports as well as to domestic production. In fact, the valuation of these imports for tax purposes frequently includes some costs such as freight which are not included in the tax calculation on Canadian production; this may confer a very slight advantage on the Canadian manufacturer. Similarly, excise and customs duties on imports of highly taxed products such as whisky and cigarettes are higher than on domestic products. In addition, differences in retail mark-ups, either by provincial governments in the case of alcoholic beverages or by retailers in the case of tobacco, favour the Canadian manufacturer.

¹²Submission by E. Howard Smith, President, Howard Smith Paper Mills.

¹³Whether or not corporation taxes are properly classed entirely as "costs" is a matter which we do not propose to debate here.

¹⁴*Certain Aspects of Taxation Relating to Investment in Canada by Non-Residents*, p. 12.

Relationship with United States Industry

We have referred a number of times to the many corporate links between secondary industry in Canada and the United States. One important aspect of this question is the extent to which Canadian secondary industry is owned and controlled by Americans. Since foreign ownership of Canadian industry as a whole is considered in some detail in the Commission's study *Canada-United States Economic Relations*, we propose to touch only briefly on the statistical record; Tables 41 and 42 are drawn from that study and present control and ownership data in summary form.¹⁵ The essential facts are these: on the basis of gross value of output, close to one-third of Canadian secondary industry is controlled by United States residents, although in terms of percentage of capital employed the proportion is slightly higher; in such important secondary industries as automobiles and parts, rubber products, electrical apparatus, chemicals and oil refining, between 50% and 98% of total output is produced by United States controlled companies; at the other end of the scale, the primary iron and steel, textiles, (excluding synthetics where the leading producers are all controlled by non-residents) tobacco, beverages and agricultural implements industries are largely owned and controlled in Canada.

The statistics alone do not give a complete picture of the extent of the working relationships between firms in the two countries. Some Canadian firms, such as Massey-Harris-Ferguson, and Distillers-Seagrams, have United States subsidiaries which are as large or larger than the Canadian parent. In other firms where Canadians hold over 50% of the equity, an American minority representation may be concentrated enough to maintain effective control. Still other companies have licensing arrangements with American firms whereby they have access to designs, patents, and inventions without the existence of any corporate links. Finally there are Canadian companies, such as those in the primary iron and steel industry, which participate with United States firms in an exchange of information about new ideas and techniques on an informal or co-operative basis or through such organizations as the American Iron and Steel Institute.

The causes for this close business relationship are not difficult to find. Geography, close personal links, the extensive tourist trade between the two countries, the pervasiveness and persuasiveness of American advertising, the generally high quality of American manufactured goods, the similarities in attitudes and cultures, have all tended to create in Canadians a desire for products of American style or design, particularly in the field of brand-name consumer durables and machinery. The developing Canadian market for many of these products of secondary industry is usually first satisfied by imports from the United States producer. Eventually the Canadian market is large enough to permit the establishment of a branch plant in Canada to

¹⁵Appendix B of that study gives the names and locus of control of leading firms in a number of important secondary industries.

assemble the product of imported components, with the timing of the move into Canada conditioned in part by the level of tariff protection and by the prospects of action by competitors. In the final stage, a large proportion of the components are manufactured in Canada. This process is continuous, with new products being introduced steadily by the parent in the United States. As a result the Canadian branch continues to expand with the growth of the parent as well as with the development of the Canadian market; it may become more independent, more Canadianized in its activities, but the links with the parent usually remain strong.

If the interrelationship between Canadian-United States secondary industry is in part the result of proximity and natural evolution, it has also a sound economic rationale. We have emphasized that the greatest handicap facing Canadian secondary industry in meeting American competition is the smaller market and the inability to achieve the same economies of scale and specialization. The handicap would be very much greater if Canadian subsidiaries were unable to draw on American parents for the fruits of research and engineering and process development and for design and complex parts, as well as for the customary requirements of any subsidiary for management, advice, staff training and capital. In many of these functions carried on by the United States parents the economies of scale are very large; in some it would be impossible for the Canadian subsidiary to duplicate the work of the parent at any cost within reason. These economies from scale and specialization are by no means of equal weight in all secondary industries, but it is hardly a coincidence that American control and ownership of Canadian industry is substantial in such industries as automobiles, chemicals, electrical equipment and rubber products, which spend large amounts on research, new products, design, tooling and engineering.

Perhaps nowhere are the advantages accruing to Canadian industry from access to the parent more apparent than in the broad spectrum of activities classed as "research and development", which includes everything from pure scientific research down to the very practical aspects of design and process engineering. In the field of industrial and applied research the acknowledged world leadership of the United States stems in part from their very large market and high wage levels, which combine to make the rewards of innovation great and the unit cost of research expenditures relatively small. Yet, as a spokesman for the electrical industry pointed out, research is a commodity much like any other. It can be bought at a price, and for most Canadian secondary industries it is much cheaper to buy it from the parent or in the open market than to try to do it themselves. The method of charging the subsidiary of course varies considerably. The study *Canada-United States Economic Relations* said that these charges:

"may be a small fixed percentage of total sales, a negotiated fee, a sum based on the proportion of the subsidiary's output or some

other similar arrangement. In a large number of companies the charges levied are substantially below the cost to the parent company, and in many others there is no specific research charge levied on the subsidiary”.

The importance of the United States connection for the Canadian automobile industry was emphasized by the president of Ford Motor Company of Canada:

“To the degree they can afford it, the Canadian companies take part in the continuing search for ways and means to make better products at lower cost. Necessarily, however, they rely upon their affiliated companies in the United States for the basic research and engineering on major projects, and for product development, because these very large companies have resources that are far beyond our reach. Hundreds of millions of dollars are spent annually in the big research and experimental centres established and maintained by the major United States companies. One of the chief advantages of the close relationships between Canadian automotive companies and their American associates is their participation in the results of United States research. The people of Canada thus share in the benefits of research that would be flatly prohibitive in cost if the Canadian companies had to undertake it on their own”.¹⁶

Comments in the same vein were made in the Commission’s studies of the automotive, electronics, and electric manufacturing industries. Canadian industries which do carry on a substantial amount of research (the pulp and paper and aluminum industries are perhaps typical of these) have been able to do so only because they have access to world markets, and have become important world producers of these commodities. In this connection an industry brief stated:

“Shawinigan Chemicals is often cited as an example of a company wholly owned in Canada which has benefited greatly from its own research. While it is true that Shawinigan has carried on industrial research on a comparatively large scale for more than 35 years and has developed important new processes and products, yet it must be admitted that the most important of these have had to be exploited outside of Canada in order to justify the expenditure on research and development. The Canadian market for Shawinigan’s polyvinyl acetate and acetal resins has been disappointingly small, but our operations in the United States based on these materials have been an outstanding success, and continue to grow. . . . Actually what has made (our research) programme possible from the standpoint of return on the money invested in research and development, is the

¹⁶*Hearings*, Toronto, January 31, 1956, p. 5586.

successful exploitation of our inventions in foreign countries, principally in the United States.”¹⁷

The advantages of access to facilities in the United States, are, of course, not limited to subsidiaries of United States parents, although as Mr. Barber pointed out in the electrical manufacturing industry study, it is doubtful if any independent Canadian firm could obtain as favourable arrangements as exist between General Electric and Canadian General Electric. The close relations between these two firms are indicated by the following excerpt from a letter sent by the president of General Electric to his staff:

“It is the policy of the General Electric Company that all its departments and affiliated corporations give to C.G.E. their active assistance and co-operation in every way possible. This includes the furnishing and making available to it of full information, data, design, engineering technique, machinery layout, production processes, drawings, specifications and plans and research concerning all products G.E. and its affiliated companies are from time to time planning and manufacturing . . . Employees of C.G.E. shall be given access to G.E. factories and offices and those of its affiliated companies to the extent necessary to implement this policy.”¹⁸

Canadian firms without formal corporate ties in the United States can of course also obtain access on a commercial basis to the fruits of research and design in that country, and to some degree in other countries as well. The Commission study of the industrial machinery industry stated that the industry in general has relied extensively for research both on parent companies in other countries and on licensing and royalty arrangements which permitted the manufacture in Canada of equipment of foreign design. The submission of a large aircraft producer referred to the manufacture of military aircraft in Canada based on designs obtained “under license arrangements, at a small fraction of the cost of engineering development and research”.¹⁹ The study of the electronics industry said:

“Companies without foreign affiliates or applied research laboratories sometimes have agreements with United States companies under which they may use the results of their research work. This course of action is cheaper for these companies than the conducting of research programmes.”²⁰

Apart from such licensing arrangements, some Canadian firms have undertaken co-operative research projects with firms in the same industry in the United States. It is not known how widespread such co-operative arrangements are, but they do not appear to be common. One example was referred to by an official of a building products company:

¹⁷Submission of Dr. R. S. Jane, Shawinigan Chemicals.

¹⁸Op. cit., p. 83.

¹⁹Submission of Canadair Ltd., p. 21.

²⁰Op. cit., p. 18.

"Insofar as the cost of labour looms even larger in the future than it does today, brick lays itself open to competition from materials which are more amenable to mechanical handling on the site. The brick manufacturers in this country and in the United States have realized the seriousness of this obstacle, and the industry as a whole is engaged in a concerted research programme which promises to effect many improvements in brick itself and in the application and handling of the finished material. American industry—and we have joined in as a continental industry in this case—is doing a large research job as an industry, supported financially by an assessment of so much per thousand bricks everywhere through the industry to try to overcome some of these points of handicap."²¹

Given the easy access of Canadian secondary industry to United States research, it is not surprising that the level of research expenditure is considerably lower in Canada. Detailed comparisons are lacking, in part due to the difficulty of distinguishing between research and development proper and process and product engineering. However, estimates of qualified observers tend to place total private research expenditures in Canada in relation to sales at one-quarter to one-half the American level. The Commission study of the chemical industry quotes some comparative figures of research expenditures in Canada, United States and the United Kingdom. Although it is not known how reliable the figures are, they suggest that in 1955 per capita expenditure on research by all Canadian industry was \$2 compared to \$11 in the United Kingdom and \$12.40 in the United States. Government financed research expenditures were almost as high in Canada, however, and the aggregate for Canada was only slightly under one-half the American per capita total. As a very high concentration of those Canadian expenditures is to be found in secondary industries connected with defence and in our large primary manufacturing industries, the ratio for secondary manufacturing generally is probably much lower.

It is sometimes argued that this relatively low level of research expenditure has an unfavourable effect upon the growth of Canadian secondary industry. The brief of the Radio, Electronic and Television Manufacturers summed up this view in their comment that, although economic reasons dictated the importation of applied research:

"The present practice of adopting much of the results of United States and European research for Canadian use is not, as a long-term policy, good for Canada. Picking technical brains is a slavish form of copying which dulls the initiative and leads to mediocrity. Although money might be saved at first, in the long-term view this type of policy is uneconomical because Canada must ultimately pos-

²¹*Hearings*, Montreal, February 23, 1956, pp. 7026-7.

sess its own research facilities for national defence, for development of industry, and for domestic and overseas commerce."

Nevertheless, the economic arguments for buying research from the parent or affiliate in lieu of setting up competing facilities are very powerful. Indeed, the past record of growth of Canadian secondary industry, particularly the electronics industry, suggests that the lack of independent research has not been a handicap to our producers. It is not reasonable to expect that the type of research establishment which our industries could afford would yield satisfactory and balanced results; in many industries a research unit must be of a certain minimum size if it is to accomplish anything worthwhile. In addition, the better equipped and integrated United States research facilities are frequently more attractive to scientists and engineers than a small laboratory in Canada, even if the salary differential did not usually favour the American position. Finally, the "pot of gold at the end of the rainbow" which awaits successful research tends to be much smaller in Canada, although as we have pointed out, access to foreign markets may provide the necessary reward:

"The cost of taking the project from "test tube to tank car" usually runs into several million dollars, and it is a matter of simple arithmetic to show that in order to justify the expenditure a market of a certain minimum size must be available. Only in exceptional cases does such a market exist in Canada. Furthermore, a chemical company offering a new product of unknown use is at a disadvantage in Canada as it must rely on the research staffs of consumer or secondary industries to find uses for the new material. This type of research is almost non-existent in Canada, and if the product is a new chemical intermediate it falls on rather barren ground. In the United States, on the other hand, chemical corporations frequently spend upwards of twenty million on research, plant and market development on a new product before receiving a cent of revenue, but these companies proceed in the knowledge that they can create a market and that there are hundreds of chemists and research engineers in the secondary industries who are ready and willing to investigate new uses for the new material."²²

Of course, in secondary industries and products where the Canadian market is relatively large, such as waterwheel generators, switchgear, and other specialized equipment, Canadian research and engineering expenditures are also relatively large. In fact, Canadian research developed or improved a number of such products and also led in the design of such small appliances as electric kettles and floor polishers. It must also be emphasized that in recent years there has been a considerable expansion of research undertaken in Canada by subsidiaries of foreign companies; RCA Victor, for example, has recently opened a Canadian laboratory. Some of the research work done

²²Dr. Jane, *op. cit.*

in Canadian secondary industry has arisen as a result of parent companies allocating specific projects to the Canadian subsidiary. The president of one Canadian firm stated at the hearings that the parent company, in the Netherlands, had "placed with its Canadian affiliate a project for the development of colour television as part of a worldwide programme. In effect the Canadian organization is paying in kind for the know-how it must import in other technological areas."²³ Another recent example of this trend was referred to in a newspaper report:

"A separate research department devoted exclusively to research in automobile finishes has been established by the Glidden Co. in its Toronto plant. The new department will be the centre of research in this field for the entire Glidden organization in Canada and the United States, . . . while the parent organization would continue research in this field in its plants in the United States, it was entrusting the "major responsibility" to the Canadian company."²⁴

Of course extensive research is also undertaken in a number of secondary industries which are largely Canadian controlled. The self-propelled combine which contributed so much to the postwar agricultural revolution was developed by Massey-Harris, and the new oxygen converter for steelmaking, an Austrian invention, was introduced to this continent by Dominion Foundries and Steel in 1954. In fact where research is manageable on a cost basis many of the more forward-looking Canadian secondary manufacturing firms appear ready to invest considerable amounts of money in it.

Access to United States research and development does not necessarily confer a positive cost advantage on Canadian producers relative to those in the United States. This depends on the price paid in relation to the equivalent research and development costs of competing American manufacturers. The principal advantage of these arrangements is rather that they nullify some of the very great cost disadvantages of Canadian manufacturers from their lower volume of production, and in fact make it possible for Canadian manufacturers to adopt new products and processes developed in other countries rapidly and comparatively cheaply. We have also pointed out that secondary manufacturing in Canada tends to be more of an assembly operation than it is in the United States; parts which can be produced relatively economically in Canada are made here, those in which scale is very significant are imported. This ability of Canadian producers to draw on the parent or affiliated company for complex components, as well as for tools and dies, offsets the disadvantage of scale in a manner comparable to the purchase of research, engineering and development. In fact, in those industries where the Canadian product is based on United States design, such as the manufacture of diesel locomotives, most electrical appliances, and automobiles, it is impossible

²³*Hearings*, Ottawa, March 1, 1956, p. 8018.

²⁴*Globe and Mail*, March 19, 1957.

to visualize the existence of Canadian manufacturing facilities in their present form without parent-subsidiary links or equivalent licensing arrangements and without the ability to import certain components. To put the extent of the saving involved in perspective, it was estimated by a representative of one Canadian automobile company that an American-type automobile designed and built in Canada out of Canadian parts, given the volume of production of one of the present lower-priced models, would cost in excess of \$10,000! The economies resulting from importing components are, of course, likely to be greatest in the automobile industry, because its operations involve frequent model changes, heavy capital costs for tooling and dies, and the manufacture and assembly of a vast number of complex parts.

There are other aspects of the parent-subsidiary relationship which help to keep down the costs of Canadian manufacturing in a similar way. However, the economies gained from drawing on the parent are seldom as great as those resulting from access to research and development and from the ability to obtain components which would be very expensive to manufacture in Canada. Some of the services made available to the subsidiary include the provision of management and skilled personnel, equity capital or loans, training facilities for Canadian employees, advisory and engineering services, and in a few instances, markets for the subsidiary's products. There may of course, as we have noted, be some aspects of the relationship which are less favourable to the Canadian subsidiary. The principal disadvantage arising out of the branch plant relationship was dealt with at some length in Chapter 4, where it was noted that the importation of the United States structure of industry into Canada has tended to result in an excessive number of firms sharing the small Canadian market, thus accentuating the problems of short runs and unspecialized production. In some instances the Canadian company may be permitted to sell only in the Canadian market, with the parent retaining the American, and in rare cases, other foreign markets. In a few cases the parent may require the subsidiary to buy its component parts and materials from the parent or other specified source, regardless of availability from other sources. While these practices may have a slight adverse effect upon the cost position of the Canadian subsidiary concerned, they do not appear to be at all widespread in Canadian secondary industry.²⁵

Management

Any assessment of the factors which affect the competitive position of Canadian secondary industry must involve some judgment about the relative quality of its management. One of the important characteristics of North American business, and one of the basic reasons why it is so much more productive than business elsewhere, is the skill, flexibility and enterprise of its leaders. Yet it is suggested fairly frequently that Canadian management

²⁵For a more detailed consideration of this question reference should be made to *Canada-United States Economic Relations*.

is not quite as able, aggressive or as ready to adopt new ideas and techniques as its American counterpart, even though, in general, it is considerably ahead of management in the overseas countries in these and other respects. There is obviously little concrete data available by which to judge the relative quality of Canadian and American management. Within a given industry in one country the performance of different companies in terms of profits and growth usually provides some gauge of the ability of their leaders. When comparisons are attempted on an international basis, and between industries rather than firms, this method of measurement is quite unreliable; many other cost factors which may have a greater effect on profits and performance must be considered. We have therefore been forced to base our conclusions largely on the opinions of observers and industry representatives who have some first hand knowledge of management in the two countries.

In those Canadian industries where the important firms are largely American controlled, the appointment of senior managers is, of course, generally made by the parent company. In many cases this parent-subsidiary relationship makes available specialized management skills not otherwise obtainable in Canada. Nevertheless, most American firms are aware of the desirability of staffing the senior levels of Canadian subsidiaries with Canadians, and of giving the officials of the Canadian operation as much autonomy as possible.²⁶ Indeed, where experienced Canadians are not available long-term programmes are often undertaken specifically to train Canadians for higher posts. In these circumstances, if good Canadian managers are in short supply, management of the parent company may sometimes set somewhat lower performance standards for its Canadian officials than for Americans in branch plants in the United States and at the same time exhibit some reluctance to replace a Canadian executive officer with an American from the head office. It is also alleged that some of the Americans appointed to head subsidiaries in Canada are men who are not quite equal to the calibre of the top management in the American parent company. Since the real reasons for changes in senior management are seldom revealed publicly and since the quality of management is in any event very difficult to measure, we were not able to draw any firm conclusions on this point.

With respect to industries controlled largely in Canada, the studies and briefs provided a number of random observations. The Commission study of industrial machinery, for example, stated:

"Some of the managements we met were very good indeed but others showed a lack of good managerial ability and a readiness to accept difficulties rather than an aggressive desire to overcome them. In some cases there has been a failure to assess market potential accurately after the war and a lack of quick, effective action to relate

²⁶See *Canada-United States Economic Relations*, Chapter 8.

the need of facilities and equipment to the changing nature of the market."²⁷

The Commission study of the Canadian primary textile industry had some interesting comments on Canadian efficiency at the managerial and supervisory level by disinterested observers:

"The management of some companies, particularly in recent years, was generally considered to be the equal of management anywhere. Policies and programmes, given conditions in the industry, are shrewd and well implemented. On the adverse side, perhaps the most common comment was to the effect that neither management nor union leadership have been very receptive to mass production techniques and high speed operations, even allowing for the fact that they have more limited application in an industry facing a smaller market with unused capacity. While this attitude is changing,—as one person put it, "a clear break" has been made with the past,—the change was said to be relatively recent. A long tradition of inherited techniques and basic ideas has lingered on, particularly at supervisory levels. Of course management, especially at the supervisory level, is more difficult in Canada because of the product variety typically scheduled in a given installation of company.

"From some we heard the comment that, compared with American management many (though not all) Canadian officials are less receptive to new ideas. Others on the contrary told us that top management in the two countries is about equally forward-looking. One machinery manufacturer told us flatly that most Canadian managements today are more receptive to new equipment than are most of his fellow countrymen. As in the case of the comparison of plant and equipment in the two countries, considerable evidence suggested that in years past the Canadian industry may have lagged in equipment, and in policies of modernization, and was only in the last few years beginning to keep abreast."²⁸

Additional comments on management in the textile industry were given at the hearings by a representative of the Textile Workers Union of America who stated that the avalanche of new ideas and equipment which has descended upon the industry in the postwar period found management unprepared and slow to accept the required re-training and modernization of many policies.²⁹

Mr. Young quotes a general comment on Canadian management by a management consultant firm with experience in both countries:

²⁷*The Canadian Industrial Machinery Industry*, p. 15.

²⁸*Op. cit.*, pp. 86-87.

²⁹*Hearings*, Toronto, January 23, 1956, p. 4693.

"We have met many executives in Canada and in the United States and we feel that American management is made up of a quantity of specialists which is often not the case in Canada again due to the size of certain industries. We feel that Canadian management has much to learn from contact with United States management . . . On the other hand, our Canadian management often has problems with design, market analysis, sales, labour relations which all have to be handled by the same individual. Granted these problems are often less complex but they have to be considered just the same. Generally speaking, we would say that you (the United States) have a better quality of management but that this management is made up of many specialists in various lines of endeavour. This specialization often has its drawbacks."³⁰

The composite picture which emerges from these and other private comments made to us, while by no means entirely conclusive, suggests that there is some truth in the view that management of Canadian secondary industry as a whole is somewhat less progressive and forward-looking than that of its competitors in the United States, although this is clearly not true in many individual cases. In large part the relative weaknesses of Canadian management may be due to the greater shortages of trained personnel in this country, reflecting both our more recent industrialization and our more rapid growth. However, there is a fairly widespread feeling that there has been a very significant improvement in the relative quality of Canadian management since before the war, and that this improvement has been most marked in the last half dozen years. As Mr. Barber pointed out in his study:

"Since the increased severity of import competition that developed during 1954, Canadian manufacturers of electrical equipment have been intensifying their efforts to improve their productivity and reduce their costs. According to one executive "most (electrical) manufacturing companies just started to learn how to reduce costs in 1953". Efforts to reduce costs have frequently taken the form of organizing productivity teams in each department which are given annual goals in the form of cost reduction dollars. Workers at all levels have been indoctrinated with the need for cost reduction. Improvements in productivity have resulted from better purchasing techniques, changes in design, new manufacturing methods or factory layout, revised incentive payments, simplified office procedures, improved materials handling, better inventory control and many other sources."³¹

The study of the primary iron and steel industry also spoke of the change in attitude of management between the interwar and postwar periods:

³⁰J. H. Young, *op. cit.*

³¹*Op. cit.*, p. 56.

"The primary steel industry, not only in Canada but elsewhere, has been traditionally conservative. This is due in part to the fact that a heavy capital investment is required and that the industry is subject to very sharp fluctuations . . .

"Its conservative attitude probably accounts in part for the lag in the Canadian industry during the 'twenties. As has been noted, the continuous wide-strip mills which revolutionized the industry in the United States by permitting cheap volume production of thin flat-rolled products for the automobile, household appliance and other industries, began to be installed in that country in the 'twenties and by 1939 over half the flat-rolled steel produced was being rolled on continuous wide-strip mills. In Canada, however, the erection of a continuous hot mill was still in the discussion stage when war broke out in 1939, and it did not actually come into operation until the end of the war in 1945.

"In the generally favourable conditions of the past ten years, the traditional conservatism of the industry has been less in evidence, and the timing and proportions of the postwar expansion in Canada suggest that the Canadian industry was, if anything, rather bolder than the U.S. industry in the early phase of the expansion that followed the outbreak of the Korean war."³²

This industry, in which management is nearly all Canadian, is indeed one of the most efficient industries in the country and indicates that some segments of Canadian management are the equal of management anywhere in the world.

One businessman commented that Canadian manufacturing before the war was largely dominated by financial interests in Montreal and Toronto, particularly in the former city, and that management in manufacturing reflected the conservative financial point of view. Although Canadian manufacturing industry still centres around our two largest cities to a considerable extent, manufacturing is not only much more diversified in nature but the control over it no longer lies in a few hands. It has also been suggested that the dependence of Canadian subsidiaries upon their United States parents for so much in the way of new products and advice had created in the minds of management a "subsidiary complex"—an excessive leaning on parental guidance—and that this restricted initiative. If this was true before the war it is certainly less true now; perhaps the most important contributory force to the improvement in Canadian management has been the more dynamic nature of the Canadian economy itself. Canadian businessmen are being subjected to competitive pressures very similar to those which for over a century have kept American business leaders at the forefront in innovation, enter-

prise, and efficiency. Moreover, the traditional lag of Canadian businessmen behind their American counterparts has been further reduced by the development of improved travel and communication facilities, the attendance of Canadians at American management schools, the opening of Canadian schools of business administration, and the wide dissemination of American management techniques and ideas through such media as business publications, journals and conferences. These factors, which are largely based on the recognition that good management is a science as well as an art, have resulted in Canadian businessmen being brought into closer contact with the newest developments in the management field in the United States. If some gap in relative management efficiency remains, there appears little doubt that the gap is not only much narrower than it was 20 years ago but that it is continuing to close.

Capital Costs and Profits

The higher cost of borrowing money in Canada may affect the relative cost position of some industries, particularly those of a capital-intensive nature. Bank interest rates in Canada are higher than in the United States, although they are not as important an element of costs as bond interest. Interest rates on corporation bonds in both countries vary widely according to the market's view of the quality of the company and the extent of the risk, but a comparison of yields on bonds of Canadian and United States firms of roughly equivalent quality shows a consistently higher yield on the Canadian issues. The amount of the differential is difficult to measure, due to the lack of precisely comparable firms, but a consensus of opinion suggests that over the past decade it would average at least one percentage point. In effect, interest rates on Canadian corporation bonds have been about one-third to one-quarter above the American level. It might have been expected that the growing attractiveness of Canada to foreign investors in recent years would have tended to narrow the differential, but the recent conditions of tight money make the detection of any long-term trend of this nature difficult.

The impact of higher interest rates on the costs of Canadian secondary industry generally is very considerably reduced by the fact that Canadian companies since the war have met a substantial part of their capital needs internally rather than by the issue of bonds or stock. Although it is difficult to segregate financial statistics for secondary industry, such data as are available for Canadian industry as a whole suggest that close to 70% of capital requirements in the postwar period has been financed out of retained earnings or depreciation reserves.³³ There is no reason for assuming a different pattern for secondary industry. Moreover, many of the more capital-intensive secondary industries are subsidiaries of United States corporations, and can draw on the parent for financial assistance presumably at nominal or reason-

³³See Bank of Canada Statistical Summary, November, 1954. D.B.S., Corporation Profits (Quarterly).

able interest rates. In effect, the amount of outside money required by secondary industry has been relatively small, and fractionally higher interest rates on it cannot be a very significant cost factor. The experience of the primary steel industry, as referred to in the Commission study, is typical:

"Interest rates are normally somewhat higher in Canada than in the United States. However, the Canadian primary iron and steel industry has had little recourse to the capital market in Canada—or in the United States for that matter—since the war. One loan for capital purposes was floated in the United States, and debentures have been issued in Canada by three of the major companies; but this borrowing has constituted a comparatively small portion of total postwar capital expenditures, which to a large extent have been financed out of retained earnings and depreciation allowances."³⁴

If the dividend yield on a company's common stock may be regarded in one sense as the price paid by the company for the use of equity funds and retained profits, then in this respect Canadian industry has an advantage over American industry. In contrast to bond yields, the return on public issues of Canadian common stock is, on the average, lower than on American, perhaps by between three-quarters of 1% and 1%. It is difficult to say how applicable this comparison is to secondary industry as a whole, since a large number of Canadian firms are wholly-owned subsidiaries of United States companies for which no public dividend record is available. However, the shares of those firms in Canadian secondary industry which are publicly traded are characterized by lower dividend yields and higher price-earnings ratios than similar firms in the United States. That this is a general phenomenon is evidenced by the following comparison of dividend yields on the common stock in roughly comparable American and Canadian companies: United States Steel, 5%, Steel of Canada, 2.7%; Standard Oil (N.J.), 3.7%, Imperial Oil, 2.5%; DuPont (U.S.), 3.7%, DuPont (Canada), 2.2%; Union Carbide, 5%, Shawinigan, 2.4%; and Oxford Paper, 4.5%, Howard Smith Paper, 3.6%. One of the explanations for the contrast between interest rates and common stock yields in Canada is that prospective growth has in part replaced income as the dominant factor in gauging the worth of a stock. Apparently investors, foreign as well as Canadian, have regarded the growth prospects of the Canadian economy more favourably than that of the American in the postwar period. The relative scarcity of better grade Canadian equity securities has also contributed to some extent to the relatively low yields available on Canadian common stocks.

It also appears that in some manufacturing industries Canadian companies earn a lower profit on investment or sales than similar firms in the United States. It is of course very difficult to make realistic comparisons of industries in the two countries due to such factors as different accounting

procedures and methods of defining profit, different rates of depreciation or taxes, and different industry groupings; however, some data is published for 1953 in Tables 43 to 45. In that year total profits before taxes for all United States manufacturing industries were about 15 to 16 times as large as in all Canadian manufacturing. Allowing for the fact that about 88% of United States manufacturing is secondary industry by our definition, compared with 75% of Canadian manufacturing, and assuming profits are distributed in much the same way, the ratio of profits in secondary industry in the two countries appears to have been not very different from the ratio of production. The data in Tables 43 and 44, however, while subject to errors arising out of lack of comparability show that in Canada in 1953 manufacturing profits amounted to 4.1% of sales compared to 5.3% in the United States. Table 45 shows that as a percentage of net assets the comparative figures are 9.9% and 12.5% respectively. The evidence of recent trends in total manufacturing profits in the United States and Canada is conflicting, one United States series showing a faster rise than the Canadian, the other suggesting the reverse.

The figures for individual industries may be somewhat more meaningful than the comparison of the aggregates. Mr. Barber cites some comparative figures of net income after tax in the electrical machinery industries in Canada and the United States.³⁵ These figures show that although in 1953 the profit as a percentage of book value was slightly higher in Canada, in most prewar years the reverse was true, and in 1954 and 1955 Canadian profits declined sharply compared to a relatively slight fall in the United States.³⁶ He adds, "Lower profit levels in Canada also appear to be part of a general pattern under which Canadian manufacturers earn a lower rate of return than their counterparts in the United States". The electronics study found that 14 Canadian firms showed in 1955 a net profit before taxes of 4.7% on sales, and 15% on net investment. The corresponding figures for 24 American companies were higher, 7.3% and 18.4%. Exhibit IV in the Commission study of the agricultural machinery industry suggests that while Canadian companies did as well or better than United States companies up to 1950, either in relation to sales or investment, in 1954 and 1955 Canadian profit ratios were very much lower (possibly as a result of management difficulties in some segments of the industry). In both the chemical and petroleum refining industries the Canadian profit margin on sales is also much lower. On the other hand, there does not appear to be any marked difference between the profit performance of American and Canadian firms in the rubber, industrial machinery and primary iron and steel industries; the Commission study of the latter industry found that the profit-to-sales ratios of three Canadian firms were in the same general range as those of the seven or eight largest United States companies.

³⁵Op. cit., pp. 16-18.

³⁶Preliminary indications are that profits in the Canadian industry increased substantially in 1956.

While the evidence is too fragmentary to be conclusive, it does suggest that profit margins in a number of American secondary industries have recently been higher than in Canada, whether the calculations are based on sales or on net investment. As we intimated earlier, this may be due to the fact that those who own or control companies in Canadian secondary industry are prepared to accept lower rewards now in the expectation of greater growth and profits later. It may also be attributable to unjustified optimism on the part of some United States parent companies which leads them too readily to open up branches in Canada; subsequently they are reluctant to close down these operations if they are unprofitable. Nevertheless, such evidence as is available covers a very short period of time, and it may be that the postwar period has been too abnormal to allow the drawing of any firm conclusions. In any event it is quite clear that as profits on the average only amount to 4% to 5% of selling prices, small differences between the profit rates in the two countries cannot have had a very significant effect on relative costs and prices in secondary manufacturing.

PRODUCTIVITY, COSTS AND GROWTH

IN THIS CHAPTER we will attempt to compare productivity in Canadian secondary industry with that of other sectors of the economy and with that of United States secondary manufacturing. We will then recapitulate the reasons for the lower level of output per man and higher costs of production in our domestic manufacturing as compared to that in the United States. The chapter, and this section of the study, will end with a brief summary of the impact of these productivity and cost factors on the pattern of growth and development of Canadian secondary manufacturing as a whole. It should be emphasized at the start that productivity is a difficult and elusive concept and that its accurate measurement involves formidable problems. While we believe that the figures employed in this chapter are useful indicators, we must urge that careful note be taken of their qualifications and limitations.

Average productivity can be calculated by dividing the total *net* output by the number of units of inputs required to produce it regardless of whether a firm, an industry, or a whole economy is being considered. In practice, the unit of input most frequently chosen as the denominator is the man-hour of labour, a measurement which is satisfactory enough as long as it is remembered that labour productivity does not depend only on labour effort. It also comprehends the quality and magnitude of available natural resources, the amount and quality of capital equipment used, the skill, intelligence, and training of all personnel, the nature of production permitted by the size of market available, and the quality of organization and management. It should therefore be noted that in theory net output can be attributed to the productivity of capital, or labour, or some combination of the two types of inputs. The terms "productivity per man-hour", or "labour productivity" are thus only a form of shorthand and are not meant to imply that productivity is attributable exclusively to labour effort and ability.

Productivity increases are defined by us as gains in net physical output per man-hour, as contrasted to gains in *production* which may be due either to greater inputs of manpower and materials or to greater productivity.

Being a net concept, productivity excludes that part of production attributable to inputs from other industries such as materials, fuel, and power. Thus, if the gross output of a farmer rises by \$1.00 an hour only because he uses another \$1.00 of fertilizer per hour, no gain in productivity has taken place; the economy has gained additional farm production only by using more of its resources to make fertilizer. However, if the rise in output had been due to, say, improved farm management, productivity per man-hour can be said to have risen; the economy has gained additional goods and services without using up additional resources of labour and materials and is therefore wealthier than before. The importance of such productivity gains to the economy can be appreciated by recalling that once maximum labour-force participation rates are reached in a full employment situation, further increases in the standard of living can only come from a rise of efficiency in production. Growing population and employment will increase total wealth, but there is no other way to raise per capita real incomes than by increasing real productivity.

Sector Comparisons in Canada

For purposes of comparing real net output per man-hour in secondary manufacturing and other sectors of the Canadian economy, we have used the series of Gross Domestic Product per man-hour developed by the Commission's staff. As indicated in Chapter 2, this measure of real net output in Canada is "gross" in that it does not exclude depreciation allowances for capital consumed, but it is nevertheless the best net output data available. It should also be pointed out that, quite apart from any gaps in the original data, no series of output can entirely solve the so-called "index number problem"; different price bases and different commodity bases give different indices of growth, because the relative importance of individual commodities chosen to make up the index of physical output in the base year may decline or increase greatly over time. Thus while a series based on one year, in this case 1949, is not necessarily less valid than another, it must be remembered that the results can only be approximations. Similarly, the data on labour inputs, or total man-hours worked, is not as complete as might be wished in all cases. In summary, no claim is made that the productivity figures are precise, particularly in view of the fact that small errors in calculating either input or output can lead to comparatively large errors in the final results. However, we believe the data are useful as a broad measure of productivity and of trends in productivity in different sectors of the Canadian economy.¹

Gross Domestic Product per man-hour for the main sectors of the Canadian economy in 1946 and 1955 is shown in the following table:

¹For more detailed discussion of the Commission's productivity estimates and the material on which they are based, see *Output, Labour, and Capital in the Canadian Economy*.

Table H

G.D.P. PER MAN-HOUR IN 1949 DOLLARS

Sector	1946	1955
Agriculture58	.99
Resource industries	1.67	2.45
Primary manufacturing	1.46	1.97
Secondary manufacturing	1.35	1.77
Transportation, storage and communication	1.43	1.73
Trade, finance, services and construction	1.31	1.46

Of course, there are wide variations within these broad sectors from industry to industry and from region to region, just as there are in the United States. Furthermore, because the figures include depreciation, which is really a cost item, they tend to overstate somewhat the net productivity of the resource and primary industries, in which capital-intensity is well above average, and to understate that of the trade, finance and services group. On the other hand, real secondary manufacturing productivity relative to that in the primary and resource industries is considerably overstated because the higher prices resulting from tariff protection inflate the dollar value of its physical output. As these prices appear to be 10-15% above world prices, effectively those in the United States, a net downward adjustment of 5% to 10% to, say, \$1.65 would perhaps give a more accurate picture of comparable physical productivity in this sector. Adjustments would also be necessary to compare agriculture and services with the resource and primary industries. Because of our economic structure and our rich natural resources, average productivity in our resource and export industries as a whole is considerably above that in secondary manufacturing; this is in contrast to the position in the United States. The only commodity-producing sector in which productivity per man-hour is significantly below that in secondary industry is agriculture. This is presumably due mainly to the still substantial, although sharply declining, number of marginal farms, but it is undoubtedly due in large part also to statistical weaknesses in the coverage of agricultural output.

Nevertheless, productivity in secondary industry has been increasing rapidly. From 1946 to 1955, the rate of growth in Gross Domestic Product per man-hour in secondary manufacturing was just over 3% compounded annually, a figure which compares with only 1.2% in the less mechanized trade sector and with somewhat more than 2% in the transportation group. On the other hand, the rate of gain in the more highly-capital-intensive resource industries, which has traditionally been above average, was some 4.35% per annum. In agriculture the rate was even higher, over 6% per annum, reflecting the sharp upsurge in farm mechanization and improved farming techniques as well as favourable weather and crops and the virtual disappearance of concealed unemployment in farming at the start of this period. These gains in agricultural productivity were thus in some measure due to non-recurring factors and were not representative of the long-term

trend in this sector. Primary manufacturing productivity gains were broadly the same as those in the secondary sector, being a fraction of a percentage point higher. These rates of productivity gain in secondary manufacturing and the economy generally are high by historical standards, and reflect the intensified pace of mechanization and technological advance, the postwar investment boom in new plant and equipment, and the continuing trend towards concentration of production in lines which are more capital-intensive and mechanized. In summary, with the exception of the especially large productivity gains in agriculture, and the high rate of progress in the resource industries, productivity increases in secondary industry have kept pace or surpassed those in other sectors of the economy. This has been particularly true in the years since 1949, due to the effects of increased competitive pressures on efficiency as well as to the relatively rapid growth of the capital-intensive and highly productive industries within the sector.

Productivity Differences between the United States and Canada

The limitations of any international economic comparisons have already been indicated in Chapter 5. Nevertheless, we believe it is useful to attempt some such productivity comparisons with the United States, the source of our main import competition. Nothing like complete data are available on productivity in the overseas countries, but such fragmentary material as there is suggests that productivity in these countries is very much lower than in Canada, less than half the Canadian level in the United Kingdom and Germany. Moreover, it appears that gains in output per man-hour in these countries have generally lagged behind those in this country and the United States, although this of course does not apply to all products or to all countries.

Canadian Gross National Product per capita appears to be close to 35% below that in the United States. However, a substantial part of this difference is due to the fact that a higher proportion of the American population is in the labour force; the difference per worker is just under 25%.² Correcting these figures for the slightly longer hours worked in Canada, Gross National Products per man-hour in the private sector of the economy is found to be somewhat more than 25% below the comparable figure in the United States.³ In contrast to this over-all man-hour differential in output of 25%, we estimate in the following section that the difference in the secondary manufacturing sector is about 35-40% on a man-hour basis. On the other hand, it appears that the productivity of the resource industries and a number of the larger primary processing industries such as pulp and paper, metal smelting and refining, saw and flour mills, cement, and fertilizers is on the average equal to, or

²Data drawn from Chapter 13 of *Canada-United States Economic Relations*.

³*Ibid*, Table 8. All percentages are based on output figures expressed in domestic currencies, as it is believed that the lower price of many manufactured commodities in the United States is approximately cancelled out by the higher price of services in that country. The average premium on the exchange rate in 1955 was not large enough to affect the above calculations significantly.

slightly above, that in the United States, although for primary manufacturing as a whole physical productivity is perhaps 10% below the American level. The principal exception in the resources sector is coal mining, in which Canadian output per man on a tonnage basis was found in 1951 to be more than 40% below that in the United States.⁴

The combined effect of lower labour-force participation rates, offset to some extent by longer hours worked, and lower productivity per man-hour in the Canadian economy as a whole of course causes Canadian per capita standards of living to be some 30-35% below those in the United States. The smaller amounts of real goods and services available to Canadians are reflected in our lower per capita consumption of almost all products, from foods to automobiles and from textiles to electrical appliances. Looking at this disparity in a purely mechanical way one finds that about one-quarter of the differential is due to the lower labour-force participation rates in Canada, while a somewhat smaller amount is due to differences in the net foreign investment position of the two economies⁵ and to the fact that a greater proportion of our labour force is engaged in agriculture where productivity is well below the national average. A further quarter of the difference is due to lower productivity in secondary manufacturing, while the balance is widely distributed among other sectors such as agriculture, construction, primary manufacturing, transportation, and services. Put in another way, if physical productivity per man-hour in Canada had been equal to that in the United States in 1955, another \$9-10 billion of real goods and services would have been available to Canadians in that year; if productivity in the secondary industry sector alone had been equal to that in the United States, the comparable figure would have been \$3-3.5 billion. These calculations are entirely mechanical, but they nevertheless serve to illustrate in a vivid way the effect of productivity on standards of living. Conversely, if our productivity were as low as that in Germany or the United Kingdom, our per capita living standards would be only around half what they are today.

Secondary Manufacturing Productivity in Canada and the United States

The difficulties of making sector comparisons of productivity in Canada and the United States are considerably greater than those involved in making national comparisons. While a Gross Domestic Product series, which is considerably more "net" than Gross National Product, is available in Canada, comparable data do not exist for the United States. Conversely, a series on the net national income originating in individual manufacturing industries is published in the United States, but not in Canada. In the circumstances, we were obliged to rely on the rather less comparable value-added data available in both countries. However, as two alternative methods of corroborating the results yielded much the same conclusions, we are satisfied that

⁴John H. Young, op. cit., Appendix D.

⁵Because Canada is a debtor country, a small proportion of our income must be used to pay interest and dividends to non-residents. In contrast, the United States is a creditor country.

our calculations are reasonably accurate, although perhaps somewhat conservative. Moreover, if physical productivity in Canadian secondary manufacturing were not relatively unfavourable it would be difficult to explain why most of our secondary industry is dependent to some extent on tariff protection and why it is subject to competing imports from the United States over an average tariff level of more than 15%. In strict logic, this approach does no more than confirm that the productivity differential between Canadian and American secondary industry as a whole must be greater than the average man-hour differential of 25% between the two economies as a whole. However, the extent of effective protection used in our domestic manufacturing suggests that this additional productivity gap is probably at least some 10-15%.

The value-added data on manufacturing in Canada are, as noted in Chapter 4, less net of inputs of materials and services from other industries than are the corresponding data in the United States. In 1953, a typical year, the net national income originating in all Canadian manufacturing was only 71.2% of the manufacturing value-added figure, whereas in the United States the proportion was exactly 80%. On the reasonable assumption that this relationship applies equally to both categories of manufacturing, we have reduced the Canadian value-added per man-hour figures by 10% in order to put "net" output on broadly the same basis in the two countries. Furthermore, because the dollar value of physical output is inflated in Canada by the fact that prices of secondary manufactured products are higher in this country than in the United States, an additional downward adjustment must be made to the Canadian figures. As shown in Table 49, ex-tax prices of secondary manufactured products in Canada on the average appear to be at least some 10-15% higher than in the United States. The prices of goods actually manufactured in Canada may well be even higher because the average is pulled downward by products and components imported at low or free rates of duty. On the other hand, a part of the higher price level of manufactured goods in Canada is due to the higher costs of manufactured materials and machinery. Of course, the higher average price of inputs of materials and machinery does not inflate the dollar value of *net* output in Canada. A partially offsetting adjustment must therefore be made for this factor, and we have used a price deflator of only 10%.

It was not possible to ascertain whether classification differences between "production workers" in the United States and "wage-earners" in Canada had any significant effect on the average figures, but we are inclined to believe that any net adjustment of inputs and outputs arising from this factor would be small. On the other hand, it is possible that the hours of work data may very slightly overstate total Canadian labour input, and thus somewhat reduce Canadian output per man-hour. This is due to the fact that the United States labour input data may make more complete allowance for holidays, plant shut-downs, strikes, etc. In any event, labour input, hours of work, and

uncorrected value-added data underlying the analysis are shown in Tables 47 and 48. The first line of Table 46 shows that Canadian value-added per man-hour in secondary industry, as adjusted, is just under 40% below that in the United States. In comparison, the results arrived at by using a broad wage-price approach suggest an answer rather closer to 35%. Wages and salaries, which account for by far the greater part of net production in secondary manufacturing, are some 25% below those in the United States, while prices, as adjusted above, are at least 10% higher. The discrepancy of less than 5% between the answers yielded by the two methods is perhaps less than one has the right to expect in dealing with such a complex concept and such imprecise statistics.

Comparisons of physical output per man-hour in the two countries tend to support these conclusions. This latter method can, of course, best be used for industries which turn out simple, standardized, and homogeneous products; comparisons of United States and Canadian output per worker in terms of such units as barrels of beer or billions of cigarettes are relatively easy to make. However, even in these instances physical productivity figures are not strictly comparable; for example, the type of beer made in the two countries differs noticeably, as does the proportion which is bottled or sold in cans. While the number of barrels of beer produced per worker in Canada and the United States is therefore a useful indicator, a complete comparison of productivity would also need to take account of differences in the real value of net output in the two countries due to differences in quality, packaging methods, and degree of processing. This last factor seriously overstates Canadian physical productivity in industries producing more complex products such as cars, refrigerators, and electronic equipment. In such industries the proportion of the final product represented by the net value-added is less in Canada than in the United States due to the fact that many of the more complex inputs of materials and machinery are imported; Canadian production tends to be more of an assembly operation than in the United States. Thus, for example, if one worker turns out a car a year in both the United States and Canada, it would appear that their productivity is equal. However, if in looking behind the figures we find that the American worker has built an automatic transmission for his car while the Canadian has simply installed an imported transmission in his, we would be quite justified in concluding that the American's real productivity is considerably higher than the gross physical output figures alone would suggest.

While one hesitates to add to an already formidable list of qualifications, attention should also be drawn to the fact that differences in the classification of production workers in the two countries, which tend to cancel out when a whole sector of the economy is being examined, can often affect the results of productivity comparisons carried out on an industry by industry basis. Despite all these reservations, a few comparisons of gross physical output per man-hour in various secondary industries in the United States and Canada

in 1947 are given below.⁶ On a man-hour basis, it appears that Canadian physical productivity ranged from about half of the American level in the chewing gum industry, in which scale is very important, to almost the same level in the production of such food products as macaroni. Gross physical productivity in such industries as cotton textiles, automobiles and parts, tires and tubes, hosiery, bricks, and petroleum refining ranged between 65% and 70% of the American level. The difference in tobacco products was over 40%, in primary iron and steel it was just over 25%, while in industries such as leather footwear, bread, and biscuits, where volume is less of a factor, the differential appeared to be closer to 20%. In view of the lack of complete employment data on a product basis, we were unable to make extensive or precise comparisons for 1954 or 1955. What calculations we were able to make, however, suggested a slight narrowing of the gap in gross physical output per man-hour since 1947. The most startling improvement appears to have been in petroleum refining, in which for a number of special reasons, the increase in Canadian productivity has been very great in recent years. In the brewing industry the gap has narrowed significantly to a level some 10-15% below that in the United States.

These various methods of approach to man-hour comparisons of secondary manufacturing productivity in Canada and the United States suggest that our net output is no less than 35-40% below that in the same sector of the American economy. Because of the imprecision of the data, we do not believe that one can prove beyond all possibility of dispute that this percentage level is lower than it was before the war. Nevertheless all of the above methods that can be carried out for earlier years do appear to confirm that there has been some relative gain in Canadian secondary industry productivity in the last decade or two. The reduction of the gap in output per man-hour between the two economies as a whole, the fall in the market share of manufactured imports despite some decline in tariff protection, and the rapid growth of Canadian secondary industry also suggest the same thing. Furthermore, the narrowing of the price differential in many secondary products such as steel, automobiles, and electrical appliances, taken together with such productivity data as are available, tends to indicate that a small but worthwhile catching up with United States productivity has in fact occurred in the domestic manufacturing sector.

Individual Industries

Table 50 shows the Gross Domestic Product per production-worker hour in a number of selected Canadian secondary industries from 1945 to 1954. The use of production-worker hours, of course, raises the output per man-hour of this series relative to the sector figures, which are based on total em-

⁶These are largely based on work of John H. Young, *op. cit.*, Appendix C.

ployee man-hours.⁷ This Gross Domestic Product series is not comparable with the United States value-added data because it is more net of inputs from other industries and thus tends to exaggerate the productivity differential between the two countries. We do, however, believe that the series offers a fair basis for comparing productivity in individual industries in Canada, although the possibility of error in constructing the original data should not be overlooked. Furthermore, the relatively greater importance of depreciation costs in some industries may tend to overstate somewhat their truly net productivity. The results in some industries may also be inflated due to the fact that special protective or competitive conditions in Canada may enable those industries to realize higher prices for their products relative to the United States than can the average secondary manufacturer.

In spite of these defects, the table does reveal in a broad way the high and low productivity industries in the secondary manufacturing sector. Compared to an hourly average output per wage-earner in the sector as a whole of \$2.31 in 1954, productivity in beverages was \$5.20 and in products of petroleum and coal, largely petroleum refining, was \$4.78; in both of these industries, in the former case partly because of export markets, the size of operations permitted in Canada was not too far short of the optimum. Other industries significantly above the average were secondary chemicals and motor vehicles and parts, in the latter of which it is believed that some double-counting may inflate the figures. Below the average in 1954 were the main labour-intensive industries such as bakery products, leather products, textiles, clothing, furniture, and a number of the handicraft-type industries in the miscellaneous group. The Gross Domestic Product figures unfortunately do not permit a breakdown into a finer classification than that shown in the table, but the use of value-added or gross production data, despite their limitations, serves to indicate the disparities which exist within these broad industry groupings. Thus, for example, the yearly value-added per wage-earner in synthetic textiles at some \$6,320 in 1953 was more than half as large again as in cotton textiles at \$3,769 and much larger than in woollen textiles at \$4,311; these figures compare to an average in secondary industry of \$7,252. Similarly, the gross value of production per wage-earner year in the rubber footwear industry was some \$7,000 in 1953 compared to more than \$21,000 in the rest of the rubber products industry and to no less than \$14,915 in secondary industry generally.⁸

The table also enables one to distinguish in a broad general way those secondary industries which have an above average rate of productivity growth. Once again, however, a number of important qualifications must be

⁷For purposes of comparability with the United States, the value-added data for individual industries had to be worked out on a production-worker basis. We have accordingly put the Gross Domestic Product figures on this same basis. It might, however, be noted that the proportion of salaried employees in Canadian secondary industry has risen from under 15% of the total in 1929 to more than 20% today; this trend has of course also been evident in the United States.

⁸Calculations based on the employment estimates of the rubber footwear producers in their 1956 brief to the Tariff Board.

noted. In addition to the reservations stated in earlier paragraphs, it should be pointed out that the data are available on an industry basis for only ten years, a period much too short to permit confident assertions about long-term trends. Moreover, in comparing any one year with another there are always a number of special influences at work tending to distort the comparison; for example, activity in one or other of the two years may be abnormally high or low due to strikes, shortages, demand conditions, or change-overs to new products and machinery. Finally, statistical coverage of the industry may be expanded or classifications changed; the change in the productivity figures may therefore in some cases be due to no more than alterations and improvements in the compilation of statistics.

Taking the two years 1946 and 1953 as perhaps the best for purposes of illustrating postwar productivity gains in secondary industry, one finds that in petroleum and coal products Gross Domestic Product per man-hour has risen by about 6¾% per annum compared to an average gain in the sector as a whole of just under 3%; from 1949 the figures are about 8½% and 3¾% per annum respectively. Improved processing techniques, the building of new and larger oil refineries as the market has grown and Canadian oil sources have been utilized, and the continued automation of methods, have been mainly responsible for this phenomenal rate of productivity gain. In rubber products, the gain since 1946 amounts to over 8% but the effects of the prolonged strike in the industry in that year distort these results; from 1949, however, the annual gain still amounted to over 4½%, or well above the average. Increasing mechanization permitted by the growth of the domestic market has also caused the rate of gain in the motor vehicle and parts industry to be close to 8% per annum, although because of the statistical difficulties referred to above this figure may be somewhat inflated.

In the beverage industry, the expansion of export markets for distilled liquors, the growth of domestic sales, and the modernization and enlargement of breweries, together with an increasing concentration and specialization of production, have contributed to an annual rate of productivity growth of some 3½% since 1946 and almost 8% since 1949. Much the same factors have been at work in the tobacco industry where the comparable figures are about 6½% and 9½% respectively. The agricultural implements industry provides a striking example of the effects of variations in the use of capacity on productivity; from 1946 to 1953 the annual rate of gain was just under 5½%, but from 1949 to 1953 productivity fell by almost 2% per annum. From 1946 to 1949 the compound annual rate of increase was some 18%. The rapidly expanding North American market for farm implements, the backlog of deferred demand, and the development of improved products and techniques enabled the industry to expand output enormously in the earlier period without greatly adding to its manpower or capital requirements. Conversely, when demand abated and excess capacity appeared in the industry production runs became shorter and less specialized. Overhead, distribution,

and indirect labour costs had to be spread over fewer units of output, and productivity dropped noticeably. Thus in 1949 the absolute level of productivity in this industry was some 10% above the secondary industry average, but by 1953 it was 10% below.

Productivity gains in the electrical apparatus and supplies industry, at about 3%, have been a little higher than the sector average. In primary iron and steel, gains on the basis of Gross Domestic Product since 1946 have been about 3¾% per annum, while on the basis of ingots and castings produced per man-hour they have been over 5%;⁹ in many respects the latter figure seems to accord more closely with trends in the output, share of the market, and prices of the domestic industry. Productivity gains in textiles and secondary chemicals since 1946, on the other hand, appear to be a shade below the average for secondary manufacturing, although this is not true of chemicals since 1949. However, the rates of productivity increase in a number of less mechanized industries such as bakery products, leather products, clothing, furniture, ship-building and transportation equipment, have been either negative or very small, reflecting the difficulty of mechanizing many of these operations, and in the case of some of the transportation equipment industries, excess capacity as well. Of course, widely differing rates of growth have appeared in different segments of the same industry. Value-added per production worker in synthetic textiles, for example, has risen almost twice as fast as in the wool and cotton sections of the industry since 1946; if these figures are adjusted for relative price changes, the gain is very much more pronounced.

In the past three years further substantial increases in productivity in many of the more mechanized industries such as iron and steel, electrical equipment, and automobiles appear to have taken place. For example, the output of ingots and castings per man-hour in the primary iron and steel industry was some 12½% higher in 1955 than in 1953. In general also, employment and hours of work have risen substantially less than the corresponding indices of physical output. Thus the index of industrial production of the durables-manufacturing industries, all of which are included in the secondary sector, was more than 8% higher in 1956 than in 1953 although total man-hours worked in these industries had risen by less than 1%. The annual rate of gain since the very minor recession of 1954 has, of course, been very much greater than that since 1953, reflecting the utilization of excess capacity that had appeared in the former year.

We have indicated that comparisons of productivity in individual industries between Canada and the United States, apart from those few estimates which can be derived from gross physical production figures, are only available on a value-added basis. All the qualifications noted earlier with respect to the comparability of inputs, outputs, and statistical coverage apply with

⁹*The Canadian Primary Iron and Steel Industry*, Table 18.

full force to these industry comparisons. Moreover, two additional reservations must be noted which very greatly reduce the usefulness of the figures. First, as already indicated, a downward adjustment of a little over 10% to the Canadian figures to reduce them to the same degree of "netness" as the United States series is necessary for the sector as a whole; however, there is no way of knowing how this should be applied to individual industries—in some cases it might be 20%, in still others it might be necessary to raise, rather than lower, the Canadian figures. Lacking any information on this matter, we have had to take the statistically unjustifiable step of reducing the Canadian value-added of each individual industry by the 10% average which applies to the sector as a whole. Secondly, the price adjustment necessary to value Canadian net output on a basis comparable to that in the United States had to be carried out in a fairly arbitrary manner. We have tried to use the most appropriate deflator available for the industry concerned but there was no precise way to solve the problem of working out the correct compensating adjustment for that part of higher Canadian selling prices which is attributable to higher Canadian prices of inputs of material and machinery. In the event, all we could do was make what seemed to us reasonable and conservative allowances for this factor in each industry.

We have published the results of these calculations primarily as a matter of interest and do not therefore pretend to claim that the productivity comparisons of individual industries given in Table 46 can be considered as very reliable. In contrast, as previously stated, we believe that the sector average given in that table, and arrived at by sounder statistical methods, is reasonably accurate. Looking at the results for individual industries with this somewhat jaundiced eye, one finds that the differential of 10%-15% in the beverage and petroleum industries agrees broadly with the results of domestic productivity calculations and with the physical output, price, and trade figures mentioned earlier in this study. The differential in rubber products, at just over 15% looks low on the basis of the 1947 physical output calculations; however, there has been a noticeable improvement in the productivity and relative prices of most of the Canadian industry in recent years, particularly in the standard lines of tires. The spread in leather products, textiles, clothing, furniture, printing and publishing, and industrial machinery, at 37½%-45% is not too different from what one might expect on the basis of alternative data, as is the below average differential of 30%-35% in the automobile and electrical equipment industries. On the other hand, the differential in secondary chemicals and primary iron and steel, at about 45%, appears to be unduly large in the light of domestic productivity, price, and import data; this result also conflicts with the gross physical production comparisons given earlier for primary iron and steel.

The productivity figure for bakery products, at less than half the American level does not accord very closely with some of the results of Mr.

Young's physical productivity comparisons, although it should be noted that it is not out of line with the startlingly low Gross Domestic Product figure shown for this industry; it is possible that Canadian coverage of net output in this industry is weak. The difference in tobacco products at over 40% agrees closely with Mr. Young's findings; it is also compatible with the very rapid growth of Canadian productivity in this industry because productivity gains in the American industry also appear to have been extremely large. Possibly the most contradictory result that emerges from the table is the difference of over 55% in the railway rolling stock industry—much the same conclusions are arrived at if any of the preceding years are taken. Despite the diseconomies of small scale operations in the building of diesel locomotives, an extremely wide differential of this nature seems hard to reconcile either with the relatively large size of Canadian operations in the manufacturing of freight cars or with the comparatively low level of imports and domestic prices in this industry (abstracting from the price effects of the tariff on materials and components).

In agricultural implements, despite the downturn in Canadian productivity in recent years, productivity per man-hour on a value-added basis is shown as some 32% below the United States, or less than the average; this comparatively large differential would appear to reflect the fact that some Canadian production facilities are less specialized and efficient than those in the United States. In any event, in view of the many qualifications stated above, we would not wish much reliance to be placed on the relative productivity figures for this or any other industry, even though a weighted average of these figures comes to within about 1% of the sector results obtained by the use of more justifiable statistical techniques. We did not believe we should publish an industry by industry comparison of secondary manufacturing productivity in Canada and the United States over time, in view of the limitations of the data themselves and in view of the fact that the United States value-added series is available only since 1947. Because of the narrow margins of permissible error, the shortness of the period, and the difference in the timing of postwar decontrols in the two countries, it is clear that the results of such an exercise are of dubious validity indeed. They do, however, suggest a slight narrowing of the productivity gap in the sector as a whole and a more pronounced improvement in some of the relatively capital-intensive industries.

Summary: Productivity and Costs

As we have indicated in Chapter 4, we believe that some three-quarters or more of the productivity differential of 35-40% between Canadian and American secondary industry is attributable to the smaller scale and less specialized nature of manufacturing operations in this country. This view is confirmed by the contrast with those resource and export industries which,

by reason of their access to world markets, are able to benefit from long runs and specialized production and thus achieve an average level of productivity not very different from that in the United States. This, of course, does not apply to some of the domestically oriented primary industries like certain types of food-processing. Similarly, some of our secondary industries like oil-refining and beverages are able to achieve big enough volumes of output in local Canadian markets to be quite close to the United States level of productivity, even though this is not true for secondary manufacturing as a whole.

As already noted, the problem of unspecialized production in Canadian secondary industry is due to many causes, including the excessive fragmentation of the Canadian market stemming from our importation of the American structure of industry. It is in part also due to the reluctance of domestic producers to specialize to the same extent as in the United States, and in some instances, to the less competitive nature of certain Canadian industries. However, in many cases such diversification of production is the only way open to Canadian producers if they wish to reduce their overhead, administration, and selling costs in the small Canadian market. In any event, short runs and the necessity of changing over from one type of production to another usually result in lower work-loads, loss of production time and less specialization of management effort and skills. In many cases also it means that machinery must be less automatic, less specialized, and slower. These disabilities stemming from our relatively small scale of output are the principal reason why our man-hour productivity is so much lower than in the United States. At the same time, productivity in Canadian secondary industry is generally very much higher than in the overseas countries because the sector is relatively much more mechanized, its machinery and equipment are more modern, and its processes and production techniques are more efficient.

Some part of the difference in productivity between Canadian and United States domestic manufacturing is probably also attributable to differences in labour effort and management ability. In the nature of things, such intangibles are difficult to pin-point and still more difficult to measure. However, it may be that the greater drive and materialism of United States labour more than offset the benefits of a more co-operative and consistent, but slower-paced, Canadian labour force. As mentioned in the last chapter, high levels of management skills are vitally important in an enterprise economy and their effect on productivity should not be under-estimated. Although enterprise may still be a more highly developed characteristic in American management, it is much less easy than once it was to attribute a large part of the productivity difference between the two countries to the greater caution and lower commercial-mindedness of Canadians. This factor may still have a small but significant effect on the differential, particularly in some industries, but the increasingly competitive nature of our domestic manufacturing,

greater business confidence, and significant improvements in Canadian management attitudes and techniques, have substantially reduced its role. At the same time, Canada's wide differential advantage with the overseas countries on the score of both labour attitudes and management skills has probably further increased.

It has already been pointed out that lower real productivity in Canada, while inevitably affecting our standard of living, would not be reflected in higher selling prices if the money costs of inputs of labour, material, and capital in Canada were low enough. In fact, however, higher prices must be paid for materials and machinery in Canada, either due to the higher costs of low-volume Canadian production or to the payment of tariff duties. Although not true of services or of all commodities, particularly local or imported raw materials, the average effect of higher material costs in the secondary industry sector as a whole appears to be to raise final costs and selling prices, ex tax, to a level some 2-4% higher than in the United States. The impact of this factor is, of course, less than it otherwise would be because many intricate components and parts are imported ready-made for assembly in Canada. If such products had to be fully manufactured in this country for the small domestic market, the large research and overhead expenditures involved would cause our production costs to rise to prohibitive levels in many lines.

We concluded that the net effect of transport, distribution, and climate on the costs of our manufactures was not very great. While transportation and distribution activities may absorb proportionately more manpower than in the United States, the money costs involved are on the average no higher because of our lower wages. In the central Canadian market these costs are actually lower than in the United States, and it is only on the two coasts, less than a fifth of the total market, that some cost disadvantage is incurred. Climate is not much more significant in its effects on manufacturing costs than in the main industrial centres of the United States, with the important exception of the building products industry. Construction activity is of course severely affected by seasonal problems, but the higher price of Canadian materials and greater seasonal overheads appear to be about offset by lower wages. There is much variation in the relative costs of construction depending on the type of building and the region in which it is to be found, but on balance we have not been able to conclude that average construction costs are very different in the two countries. Lower corporation tax rates in Canada may give our producers a slight cost advantage, while both imports and domestic production must pay excise and sales taxes. Financing costs are probably not very different in the two countries, with interest rates being about 1% higher in Canada and the cost of equity money, the main source of financing, lower. On balance, it does not appear to us that the net impact of all the factors mentioned in this paragraph significantly affect the relative

money costs of Canadian secondary industry production either in an upward or a downward direction.

The level of wages and salaries in Canadian secondary manufacturing, at some 25% below that in the United States, is, of course, the main reason why Canadian manufacturing costs and prices do not fully reflect the differential in real productivity with United States secondary industry. Nevertheless, because wages are related to average productivity in the whole economy, and because secondary industry productivity is below the average, the wage differential in this sector is not sufficient to prevent total Canadian labour costs in domestic manufacturing from being higher than those in the United States. Taking the productivity differential of 35-40% with United States secondary industry as given, this explains why average Canadian manufacturing costs and prices are in the range of some 10-20% higher than in the United States; the higher cost of materials and machinery in Canada accounts for only about a fifth of this difference. This pattern of wages, as we have noted, is basically the result of high real productivity and profitable opportunities in the economy as a whole, a fact which makes most secondary industries, with their lower productivity, to some degree dependent on tariff protection. In general, however, productivity in Canadian secondary manufacturing is high enough to offset our wage disadvantage with the overseas countries, except in a comparatively few low-productivity, high-labour-content industries.

The Record of Growth

Before turning to the future of our secondary manufacturing industry, it might be useful to draw a few conclusions about the trend of past developments in this sector. It is, of course, dangerous to attempt to summarize in a single statement the many-faceted growth of our numerous secondary industries. Yet in the growth of most of our secondary industries and in the failure of a number of those industries to achieve their share of prosperity a clearly discernible pattern emerges. In brief, the growing competition for scarce manpower and resources that has accompanied the achievement of high levels of employment throughout the world has put a substantial additional premium on technological advance, increased mechanization, and improved productivity. At the same time it has involved added penalties for those unwilling or unable to adapt themselves to new techniques and new processes, particularly in Canada and the United States where labour has generally been a scarce factor of production and where unmechanized manpower has therefore been particularly costly. The vast majority of our secondary industries have so far acquitted themselves very well indeed in this quickening race for productivity. However, other industries, while prospering because of buoyant demand and easy competitive conditions in the years immediately following the war, have been unable to keep pace with progress and have found themselves in increasing difficulty, especially in recent years.

Obviously, the development of our secondary industries has depended on the growth of the Canadian market, and the share of that market which they have been able to obtain. In practice, as we have tried to indicate, these two factors are intimately inter-related. The growth of the Canadian market has offered greater scope for longer runs of specialized production which enable most domestic manufacturing industries to lower their costs and raise their productivity relative to those of their main competitors in the United States, and to those overseas as well. Export markets have, with few exceptions, declined in relative importance in the last ten or fifteen years, with small gains in the even smaller proportion of sales to the United States market being more than offset by sharp declines in overseas shipments. In practical terms, therefore, the growth in demand for secondary industry production in the last two decades has come entirely from Canadian sources.

It was pointed out in Chapter 2 that the growth of secondary industry has traditionally been greatest in periods when the Canadian economy has been expanding buoyantly. In peace time such periods of rapid expansion have typically been associated with the growth of our resource and export industries, with heavy derived investment, rising consumer incomes, and with large inflows of capital, skills, and manpower from abroad. In the complicated growth process which has occurred, the expansion of secondary industry of course has played a large part, but such growth appears to us to have stemmed largely in the first instance from other sectors of the economy. Our conclusions on this point would seem to be strengthened by the fact that no peacetime period of particularly rapid Canadian growth can be found in which the growth of domestic manufacturing was the dominant influence. Nevertheless, the share of national output accounted for by secondary industry has increased in the long run because this sector has gained more than any other from the expansion of the Canadian economy. New secondary industries established at times of rapid growth such as the 1900's, the 1920's, and the Second World War have usually acquired the technical ability, capital, and skills necessary to survive more competitive conditions, so that when the market expanded further they were able to take full advantage of it.

It is, of course, true that as a result of pressure on domestic resources, the import share of most secondary markets tends to rise in a period of vigorous expansion. While obviously an improved share of the market at any point of time would be of benefit to secondary manufacturing, we have tried to emphasize that over the longer term the greatest growth of the real purchasing power of the domestic market, and thus of our secondary industry, has occurred in periods of rapid development of our valuable resources. The strong and rising world and domestic demand for these products appears to be the basic reason why Canada has grown faster than any other Western economy since the war. It must, of course, be emphasized that in the postwar period, a new quality of stability has been added to this whole growth process

by the achievement of high levels of employment and income in Canada and other countries, particularly the United States. Regardless of the causes of our growth, however, one should not take too static a view of the share of the market obtained by our secondary industries. A bigger and faster growing *total* market, even if the share of it obtained by our domestic producers declines temporarily, has always been the most effective stimulant to the long-run expansion of secondary industry in the past.

In any event, demand for our secondary industry production is more than three times its prewar level, and despite a rise in the share of the market claimed by all secondary manufactured imports from the abnormally low level of 16% in 1939 to about 20% today, the real output of this sector by 1956 had almost tripled. As in the United States, the artificially high share of national output achieved in the war years has not been equalled, but secondary manufacturing's present share of national production, at just over 20%, is about one-quarter higher than in 1939. This ratio is broadly unchanged from that of 1946 although in absolute terms production has risen by over 50%. Even since 1949, when normal competitive conditions started to reassert themselves, resource development began to expand rapidly, and the import share of the market consequently started to rise, the striking growth of just over 35% in the real output of the secondary sector has been only slightly below that of the economy as a whole. Very obviously then, the rapid growth of demand has been essential to the vigorous expansion of domestic manufacturing.

This is equally true of the growth of individual industries and products. The fastest growing industries have been those with the most rapidly increasing demand, such as primary iron and steel, electrical apparatus and supplies, electronics, aircraft, petroleum products, many chemicals and building materials. In some cases, this expansion of demand has been due to shifts in the pattern of consumer expenditures towards durable goods and in others it has been due to the rise in the proportion of national output spent on investment of all kinds. In still other industries and products, the increase in markets may be traced to such factors as the successful application of new technology, new resource discoveries, rising defence expenditures, or some combination of all the above factors. In contrast, a smaller proportion of spending has been devoted to many of the "necessities" of life, such as foods, textiles, clothing, tobacco, leather products and footwear generally. Moreover, within industries rates of increase in demand have been very different as was noted in the case of synthetic and wool textiles, tires and rubber footwear, and petroleum and coal products. In practice, also, industries confronted with unfavourable demand conditions usually have suffered from a declining share of the market due to their inability to realize the cost advantages arising out of longer production runs, new machinery, or new technology.

The second factor in the growth equation has been the share of the Canadian market which individual industries have been able to obtain. It was noted earlier that the mechanism of adjustment to extremely high levels of activity in the Canadian economy has usually caused the import share of the market to rise temporarily. However, this should not be allowed to obscure the fact that those Canadian secondary industries exposed to import competition have had to maintain or improve their relative cost and competitive position over the long run if they were to participate fully in the growth of the Canadian market. Indeed, since 1929 there has in fact been a noticeable increase in the share of the total market for secondary industry production obtained by domestic producers. However, as we have noted, there has been some increase in the import share of the market since the more abnormal years of 1939 and 1949, when the protection offered by tariffs, administrative measures, or import controls was much higher than at present. We have pointed out that the main reason for this longer-run improvement has not been an increase in tariffs—effective protection has declined somewhat on balance in the period—but an improvement in the relative costs and productivity of Canadian producers as the size of the market has grown, more mechanized techniques have been adopted, and management has become more aggressive and competitive.

Indeed, the fast growing industries appear to be those which are characterized by high and rising productivity, a high degree of capital-intensity, up-to-date equipment processes and technology (often obtained through affiliation with American firms), good management, and high wages. This result is not unexpected in view of the fact that for most such industries the principal disadvantage in competing with the United States has been the small size of the domestic market. The rapid growth of Canadian demand has enabled many such producers to come closer to the minimum efficient scale of production. At the same time, forward-looking management and the ability to adapt production to more mechanized and specialized processes has enabled these firms and industries to improve their productivity and costs relative to their competitors in the United States despite a narrowing of the wage differential between the two countries. In this connection, firms in the faster growing industries appear to have shown a somewhat greater than average tendency to search aggressively for or to create new markets, to make full use of new technology and manufacturing processes, and to increase the degree of specialization of their production as rapidly as the growth of the market permits. In summary, the fast growing industries have in general been marked by higher than average output per man and by relatively rapidly rising productivity.

Many such fast growing industries and products have already been mentioned, including primary iron and steel,¹⁰ most electrical and electronic

¹⁰As previously noted, the Gross Domestic Product figure for primary iron and steel, which was shown as only some 3% above the sector average on a man-hour basis in 1953, may well be low

production, rubber products (excluding footwear), motor vehicles, petroleum products, many secondary chemicals, synthetic textiles and others. There are, of course, exceptions to this rule, including tobacco products and beverages, where productivity has risen very rapidly although demand has gone up somewhat more slowly than average. In contrast, productivity in the agricultural implements industry rose very rapidly to a level above the sector average when demand was expanding at an extraordinary rate, and fell back again when demand began to contract. In general the import share and price data given earlier tend to confirm that high-productivity industries have generally been the sector's best growth industries. These conclusions also apply to most of those expanding industries whose market for one reason or another was already relatively large, including such products as pulp and paper machinery, paper-makers felts, hydraulic turbines, etc. However, in the railway rolling stock industry, productivity appears to be below average, partially due to the fact that no expansion of the market took place between 1946 and 1953.

The growth of the Canadian market and secondary manufacturing productivity has not, however, brought about as large an improvement in the share of the market obtained by domestic producers as this analysis alone might suggest. At any point in time there have always been a number of new products and techniques which in their early stages were developed only in the United States because of the large amounts of capital, research, and overhead expenditures they involved. Although the import share of older products has been falling, that of new products has tended to remain high until the Canadian market has become large enough to support an economic manufacturing operation. Moreover, there are some lines in which the minimum efficient scale of production is so large that even an extremely rapid growth in Canadian demand has not led to the development of a significant Canadian industry. Finally, there are many products in which sizable increases in the minimum efficient scale of production in the United States have also taken place, particularly in such items as machinery, complicated consumer durables, and some types of automobile parts. In such instances, a large absolute gain in the size of Canadian markets and manufacturing productivity may have brought about little or no relative improvement in our costs and competitive position. As long as these factors are kept in mind, however, it is fair to say that our fastest growing secondary industries have been those in which markets have been growing most rapidly, productivity has been high, and the use of capital has been relatively great.

In contrast, the labour-intensive, low-wage, low-productivity industries such as rubber footwear, cotton and woollen textiles, ship-building, and others have been the slowest growing of our secondary industries in the postwar period. Productivity gains in these industries have on the whole been below average, partly because the size of the Canadian market or the nature of the product does not permit the adoption of more mechanized processes.

As noted earlier, some part of the difficulties of these labour-intensive industries may well be due also to lower than average management skills and aggressiveness. Nevertheless, the number of such industries in Canada has been declining with the development of new processes and new products. Competition in many cases comes almost entirely from the low-wage countries overseas, as Canadian costs and prices of many custom-made products such as heavy electrical equipment are actually well below those in the United States. In other cases, however, where high levels of special design and engineering skills are involved, Canadian producers can out-compete both United States and overseas producers. In still other instances, particularly in certain types of industrial machinery and cotton textiles, competition comes mainly from the United States where larger markets and greater specialization have led to standardized mass-production operations. In any event, the cotton textile industry in particular has been losing ground in two directions; on the one hand to United States producers who have mechanized their operations to a greater degree than in Canada, and on the other hand to competitors in the low-wage countries whose labour cost advantages have been increasing.

Nevertheless, the over-all record of Canadian secondary industries has been one of slow but steady improvement in relative costs. Of course, quite apart from cost trends, differing levels of tariff and other protection have affected the ability of individual industries or segments of industries to compete with imports. However, it is certainly not possible to conclude that the fast growing industries have benefited from above average tariffs and that the slow growing industries have received lower than average levels of protection. The average appears to be about the same for both groups; if anything, the labour-intensive industries tend to have higher effective protection, in addition to which many of the rapidly expanding industries do not use all of their protection in some lines. Although the key-rate on synthetic fabrics is almost double that on the main cotton textile imports, the latter rate is higher than that on automobiles, about the same as the "basket" rate, and more than double the average ad valorem rates for primary iron and steel imports. Similarly, while the rate on imports of woollen textiles is somewhat below the average, that on canvas footwear with rubber soles is very considerably above, and that on industrial machinery made in Canada is also above average; protection in the latter case may be reduced somewhat by the difficulties of administering the class or kind provisions of the tariff. The protection offered by Canadian government purchasing policy and tariffs to the labour-intensive ship-building industry is certainly no lower than that given to the aircraft producers, but the growth of defence requirements for aircraft has caused the latter industry to expand markedly. While many individual examples could be given, some of which show above average protection and others the reverse, perhaps enough has been said to indicate that

one cannot easily ascribe the difficulties of the slow growing industries as a group to the fact that they receive below average protection.

This is also generally true of the tariff reductions that have taken place since 1939. Effective rates in the primary iron and steel industry appear to have fallen by proportionately more than those in the cotton and wool textiles industry, but the former industry is expanding rapidly and improving its competitive position. Similarly, tariff reductions on the mass-produced items of the electrical industry have been about the same as those on custom-built items. In general, cuts in the rates on almost all manufactured items have amounted to $2\frac{1}{2}\%$, and occasionally 5%, off the MFN rate. This is not to deny that there have not been some cases where increases in effective protection have helped to stimulate the expansion of growth industries; this has been true, for example, of government purchasing policies in the electronics and aircraft industries. In general, however, it is not a difference in tariff treatment that has caused some industries to be fast growing while others lag, but more fundamental economic factors.

In summary, the pattern of development and expansion in the secondary industry sector reveals a strong growth trend in the productive, capital-intensive, well-managed industries, and a relative or absolute decline in the less technically progressive, lower-productivity industries. This record of growth reflects the emergence of this country as an increasingly specialized, skilled, and rich industrial nation. This has raised the productivity, and thus the wages, of labour to a level that cannot be paid successfully by the high labour-content industries. In short, unmechanized manpower has come to be a more and more expensive factor of production in our increasingly mechanized economy and the growing number of profitable and productive opportunities open to labour in more efficient Canadian industries has increased the competitive disabilities of our few remaining labour-intensive industries. However, the great majority of our secondary industries have been able to adapt their operations successfully to the accelerating pace of technological advance and mechanization and have enjoyed a healthy and vigorous growth. The sector as a whole has increased in importance since 1939 and has fully kept pace with the rest of the economy in the postwar period. Moreover, most industries have slightly increased their share of the domestic market and improved their relative costs over the longer term. This has been achieved in spite of, and perhaps partly because of, increasingly competitive conditions in Canada. While there are still a sizable number of complex products which cannot be manufactured here because of the small size of our domestic market, both the range of goods manufactured and the degree of processing undertaken in this country have been considerably extended in the past two decades. In conclusion, the decline of some industries has been both caused and accompanied by an even greater expansion of the more productive and soundly-based secondary manufacturing industries.

Part III

**THE OUTLOOK FOR
SECONDARY MANUFACTURING INDUSTRY**

THE OUTLOOK IN GENERAL

IN EARLIER CHAPTERS we have tried to trace the story of the impressive growth of the secondary manufacturing sector and the reasons why some industries have grown faster than others. It is against this background that we turn now to examine the factors which are likely to bear on the expansion and development of Canadian secondary industry over the next quarter century, to hazard some guesses about its place in the Canadian economy in 1980, and to suggest some rates of growth for the various industries in the group. The outlook for individual industries, for the sector's regional development, and for its requirements of capital and skilled manpower will be dealt with in Chapter 9. Our concern in the present chapter is with the general factors which will affect the future growth of secondary industry as a whole. These are reviewed under three broad headings:

- (a) The future size of the domestic market for the goods produced by secondary industry.
- (b) The share of this market which Canadian secondary manufacturing industry is likely to obtain.
- (c) The prospects for export sales of manufactured products.

In this study we have used the assumptions which are basic to all the forecasting work done by the Commission. These are in brief that there will be no major war or depression, that employment will be well sustained, and that changes in the commercial policy of Canada or of foreign countries will not affect us significantly. Within this framework, the rate of growth anticipated for secondary industry is of course linked very closely to the rate of growth forecast for the rest of the economy. In this connection, we have emphasized that the great majority of the products of secondary industry are sold on the domestic market, and that the level of demand for manufactured goods is largely dependent on the prosperity and expansion of the economy as a whole. In appraising the prospects of secondary industry, therefore, one cannot underestimate the importance of a rapid rate of growth for the econ-

omy generally, and the maintenance of high levels of income and employment. The Gross National Product forecast for 1980 is thus in a very real sense the foundation upon which the secondary industry estimates are built. Obviously the over-all forecast itself is in part dependent upon the rate of growth of secondary manufacturing, but Canada's economic history suggests that the relationship of activity in the secondary manufacturing sector to activity in the economy in peacetime is more derivative than causal. The Commission's estimates of G.N.P. are reasonably optimistic, yielding a 1980 G.N.P. figure of \$61.8 billion in 1949 dollars, or \$76.2 billion in 1955 dollars. For purposes of our forecast we have used this estimate, which is the average of two Commission forecasts of G.N.P. based upon assumed rates of productivity increase for the private economy of $2\frac{1}{2}\%$ and $3\frac{1}{4}\%$ per annum; average net immigration for the 25 year period is assumed to be 75,000 annually in both estimates.

The Size of the Domestic Market for Manufactures

The analysis of the prospective market in Canada for manufactured goods clearly depends not only on the total expenditure of the economy for goods and services, but on the portion of these national outlays which is devoted to the purchase of manufactures. This latter analysis can be divided into three parts; consumer, investment, and government expenditure. Prospective export demand for secondary manufactured goods is considered separately later in this chapter. Consumer expenditures are expected to account for about 64% of Gross National Expenditure in 1980 compared with 63% today. The Commission study of this subject¹ suggests that in aggregate the proportion of these expenditures spent on manufactured goods is not likely to change greatly, although appreciable shifts in the demand for the various components may be expected. While we have not believed it necessary to repeat the underlying analysis of that study, a brief summary of the forecasts of some of the important consumer expenditure items is set out in the next few paragraphs. When trends are discussed, they refer to the share of total expenditure, not to absolute levels of demand.

Although the share of food in consumer expenditures is expected to fall slightly, the manufactured content is expected to rise—a continuation of the trend towards pre-packaging and further processing. The forecast fall in the relative importance of tobacco consumption will probably be offset, in part at least, by a further swing away from cut tobacco to factory-manufactured cigarettes. The amount spent on alcoholic beverages is expected to remain a fairly constant proportion of consumer expenditure, although consumer preference appears increasingly to favour domestic goods at the expense of imports. A continuation of the downward trend in the consumption share of clothing and personal furnishings is forecast which would produce a corre-

sponding decline in demand for these products. Conversely, the share of expenditures for household operations is expected to rise slightly. The important contributing factor here will be the demand for appliances, with demand for other furniture and furnishings not expected to change greatly. In aggregate the manufactured component of this form of expenditure should rise slightly.

The past trend in the expenditure share of shelter is downward, but the figure, containing as it does a substantial element of imputed rents, is not an accurate indicator of new expenditure on housing and the demand for manufactured goods generated thereby. Actual housing expenditures in 1955 were about 9% of estimated consumer expenditures; the 1980 forecast housing expenditure is only 5.3% of 1980 projected consumer expenditure. A significant relative decline in the demand for house building products is therefore expected, although there is reason to believe that it will be offset in part by the expenditure of an increasing proportion of the housing dollar on such manufactured products as expensive hardware and heating equipment, and new products such as air conditioning. Changes in construction techniques will probably also lead to greater factory production of pre-cut and pre-fabricated units at the expense of on-site construction. Altogether the manufactured content of this component will rise although perhaps not enough to offset the decline in the total. In contrast, a rising share of consumer expenditure is forecast for transportation. It is very difficult to allocate these expenditures between goods and services, but among the manufacturers to benefit most will be those in the automotive and petroleum refining industries. Personal and miscellaneous expenditures are also expected to rise relatively to overall consumer expenditures. Although the service component of this group is very large, demand for such manufactured items as drugs, cosmetics and sporting goods will be large and increasing as fast or faster than other items in the group.

Turning from consumer to investment expenditures, it might be noted that the Commission study on this subject suggests that expenditures on machinery and equipment will rise appreciably faster than the Gross National Expenditure—280% between 1955 and 1980, compared with a 184% rise in the forecast G.N.E.² This expenditure will naturally continue to be very largely for manufactured goods. Expenditures on non-residential construction, on the other hand, are expected to increase by only 122%, or by much less than the G.N.E. This would bring about a decline in the relative demand for building products, although as in the case of housing the factory-built component of construction expenditures will undoubtedly increase. Government expenditures, the third broad category of domestic demand, are assumed in the G.N.P. forecast to rise by a shade less than the G.N.P. However, government expenditures on manufactures may fall by somewhat more

²*Output, Labour and Capital in the Canadian Economy.*

than this because defence expenditures, which have a relatively high manufactured content, are assumed to decline slightly in importance. Non-defence expenditures on capital projects are expected to rise equally with the G.N.P. while no change is anticipated in their manufactured content. Other government expenditures, although expected to increase 240% compared with 184% for the G.N.P., have a low content of manufactured goods.

In summary, the conflicting nature of the trends in the demand for various classes of manufactured goods would suggest that any change in the share of total national expenditure devoted to the purchase of manufactures is not likely to be very great. However, any change that occurs will in our view probably be upward rather than downward. This view is supported by the experience of the past half-century during which time manufactures have become increasingly complex, have involved more and more fabrication, and have accounted for a larger share of every dollar spent on commodities. These trends, which have been apparent throughout the world, are expected to continue with undiminished force in the future. The rise in the proportion of incomes spent on services will thus be reflected in a fall in the importance of sectors other than secondary manufacturing.

Share of the Market

The prospective size of the market for manufactures is only one of the two main factors which will determine the rate of growth of Canadian secondary industry. The other is the share of the market which Canadian firms are able to obtain. As we have indicated, most Canadian secondary industries are exposed in some degree to import competition and their ability to obtain a larger share of the domestic market will depend essentially on an improvement in their costs in relation to the costs of their foreign competitors. There are, of course, a number of industries which are sheltered from import competition by such forms of natural protection as high transportation costs. These industries might be expected to grow even though their costs became out of line with those in other countries; growth is likely to be determined in large measure by the growth in domestic demand for their products. Nevertheless, technology is moving so rapidly that all industries will tend to be increasingly affected by the costs of competing imports or by the costs of substitute products of either domestic or foreign origin. An example of this process is the partial replacement of masonry walls in construction by manufactured metal curtain walls.

In general, however, as we have emphasized throughout this study, the comparatively small size of the Canadian market and the less specialized nature of manufacturing operations in this country are the principal explanations of our competitive disadvantage with United States producers at the present time. It was pointed out that these factors raise costs by preventing the full realization of the economies of mass production and by necessitating

the use of less automatic and slower machinery adaptable to shorter and more diversified production runs. These disadvantages of scale of course apply almost entirely to products for which volume of output influences unit costs more than favourable wage rates. These products are expected to continue to make up a high and growing percentage of the output of Canadian secondary industry. In earlier chapters we indicated that many secondary industries producing such products have improved their comparative cost position in recent years largely as a result of the growth of the Canadian market and Canadian incomes. In looking at future prospects, we find it difficult to quarrel with the use of recent trends to project the future, particularly since the prosperous, high-productivity, fast growing industries are in the strongest competitive and financial position to undertake future expansion. As these industries have best been able to take advantage of new opportunities arising out of the growth of the market and technological innovation, one would expect that as the Canadian market continues to grow, their relative cost disadvantage would further diminish.

However, we have already indicated that changing technology has a considerable impact on the minimum efficient size of manufacturing operations. Most forecasts about the gains to be made from the rapid increase in the size of our market seem to be based on the implicit assumption that the optimum size of plant needed to manufacture a given product is not likely to change much in the future. In fact, however, over the past century the optimum size of plants in a wide range of industries has been increasing steadily. This explains why the improvement in Canadian relative costs noted above has not been nearly as striking as the growth in the absolute size of our market would lead one to expect, and why future gains in this direction should not be overestimated. Moreover, the current surge of technological innovation will doubtless act to bring about even more rapid changes in the optimum size of plants in the future, although it is not by any means entirely clear whether it will favour larger or smaller scale operations. "Automation" is a much abused word, but it is considered broadly to consist of four main forms (a) automatic machinery; (b) integrated handling of materials; (c) automatic control systems; (d) electronic computers and data-processing machines.³ Whether the changes caused by automation will be revolutionary or evolutionary is beside the point; what concerns us most is their effect upon the optimum size of plant in the future, and on the cost differential between Canada and the United States.

Evidence of the effect of these changes on optimum size of plant over the past few years is somewhat conflicting in nature. It is certainly true that much of the new machinery is expensive, and is only economic if it can be amortized over very long production runs. One instance cited was that of a company which manufactured television sets in both the United States and

³See Edgar Weinberg in *Monthly Labour Review* for February, 1955, and referred to in *Probable Effects of Increasing Mechanization in Industry*.

Canada and used more or less traditional assembly line methods in both countries. However, an "automated" plant has now been built in the United States at a reported saving of \$10 per set in assembly costs, but the machinery could not be used in Canada because of the much smaller demand here, (nor apparently would it be economically feasible even if the company were able to obtain a substantially larger share of the Canadian market). This is one instance where the size of the optimum plant may be growing faster than the size of our market, and there are certainly others, particularly in the electronics industry. Of course, modern technology may also be working in favour of smaller scale operations. The study of the primary iron and steel industry⁴ refers to new techniques in steel making such as oxygen converters, "sponge iron", continuous casting, and planetary hot-strip mills, all of which could reduce the heavy capital costs of building new steel-making equipment. Dr. Vannevar Bush has some general comments which are relevant to this discussion:

"If large manufacturing companies turn to automation in extreme form, they thereby not only make a market for small companies of this sort but they also increase their own rigidity and render it more possible for the small industrial unit to prosper by reason of its inherent flexibility . . . Thus automation may have some effects that tend to increase the size and relative proportion of production of large units, but it also has important effects in just the other direction".⁵

Where the balance will be is difficult to say, but it is important to bear in mind that in the cost and productivity race Canadian industry will not be moving towards a stationary objective. For some products and at some times the minimum efficient size of plant will be growing more rapidly than the growth of Canadian demand. For other products the change in technology may reduce the optimum size of plants, while for still others no change may occur; in both of these latter cases the expansion of domestic demand will of course be fully reflected in the relative costs of Canadian producers. On balance, we believe that the net impact caused by the prospective growth of the Canadian market and technical change, will be to bring about further slow, if unspectacular, improvement in the relative cost position of our secondary manufacturers.

Related to this question of changes in manufacturing processes is the probable shift in the composition of manufacturing output towards products which are increasingly complex and difficult to manufacture. This may increase the size of the market required to make their manufacture feasible in Canada. One recent instance is the trend towards automatic transmissions in automobiles; the standard transmission is manufactured in Canada, the

⁴Op. cit., pp. 48-49.

⁵*Automation and Technical Change* (hearings before the United States Congressional Subcommittee on Economic Stabilization, 1955) p. 615.

automatic is not. Capital costs for the complex automatic transmission are high, and until there is agreement on a standardized design for all Canadian cars, it does not appear likely that the manufacture of it will be economic in Canada.⁶ However, as we have noted, the history of manufacturing is full of examples of products which were first brought in in fully manufactured form, then were assembled in Canada mainly out of imported parts, and finally assembled out of parts manufactured largely in Canada. This process of innovation, together with accompanying technological changes, has in the past been uneven in its effects upon the relative position of Canadian and American manufacturers. Future innovations will doubtless follow a similar path, with cost differentials first widening and then narrowing as the Canadian market for the product develops.

Another factor to be considered in gauging the effect of market growth upon our relative cost position is the structure of industry that is likely to develop in the future. For reasons which have been discussed earlier it would appear that in some secondary industries a somewhat artificial corporate structure has developed, patterned on the structure prevailing in the United States. This has led to an excessive number of producers attempting to share the small Canadian market. A continuation of this pattern would have adverse cost implications because it prevents economies of scale from being fully realized by individual producers. How important a factor this will be in the future is difficult to say. However, as business has become more competitive in both the United States and Canada there have been indications that marginal firms have found it increasingly unprofitable to stay in business. In our view, this competitive atmosphere will continue. It is therefore unlikely that Canadian costs will be as greatly affected in the future by the diseconomies associated with both an excessive division of the domestic market and an unnecessary lack of specialization of production. This may mean in some instances that there will be fewer plants producing for the market than there are now; in others it might actually involve an increase, with each being specialized to a greater degree than at present.

As we have suggested in Chapter 6, the Canadian climate, while on the average somewhat more rigorous than that of the United States, does not appear to be a significant cost handicap for most Canadian manufacturers apart from those in the building products industry. Although obviously the climate itself is unlikely to change much, the development of new winter building techniques may reduce its impact on the building products industry. Transportation and distribution costs were also found to have had little overall effect on the relative costs of Canadian secondary industry, although because the Canadian market is usually not large enough to permit the same degree of decentralization as in the United States, our producers are at some disadvantage on both coasts. On the other hand, Canadian producers have a

⁶*Hearings*, Toronto, January 31, 1956, pp. 5607 and 5638.

freight advantage in the main central Canadian market, a situation which is unlikely to change in the future. It also seems unlikely that the growth in the size of the Canadian market will be large enough to permit appreciable decentralization of production and resultant economies in transportation costs to the two coasts, although there may be some slight gains in this respect. Among other sources of possible cost differences we reviewed earlier were costs of construction, financing, and taxes. In few industries were the first two items found to be far enough apart in Canada and the United States to have any appreciable impact on the over-all relative cost position; however corporation taxes are somewhat lower in Canada. Although it is hazardous to predict the future course of either bond interest rates or corporation taxes, there seems little reason for expecting that future developments will diverge widely in the two countries.

We have pointed out that higher manufacturing costs in Canada are in part due to the higher price of manufactured materials and machinery in this country. This is the result both of tariffs and of higher manufacturing costs of component parts. Although the assumptions on which projections about the future are based exclude tariff changes, the gains expected from longer runs and the pressures of domestic competition should bring about some relative reduction in the prices paid by Canadian industry for materials and equipment. We expect that a large number of complex parts and components which cannot be economically manufactured in Canada will continue to be imported from the parent or affiliated company in the United States on terms no less favourable than at present. We also expect that the fruits of foreign research will continue to be available to our producers at a comparatively low price. In the next quarter century such arrangements will be even more vital to the healthy growth of secondary industry than they have been in the recent past. This does not mean that Canadian industry will be absolved from having to carry out a good deal of independent research of its own, particularly in those areas where United States or other foreign designs must be adapted to our special needs, or where our industry is large enough or specialized enough to profit from original research. However, it would be unrealistic to expect that any general shift in the present dependence on imported research is either likely or would make good economic sense. Our projections about the growth of secondary industry are therefore based on the assumption that it will continue to be able to draw on external sources for much of its technological progress, new machinery and improved production methods.

Finally, relative costs and productivity will continue to be affected by differences in the efficiency and attitudes of management and labour. There are clear indications that the enterprise and ability of Canadian management have been steadily improving, particularly over the past decade, and that some of the relative gains made by Canadian secondary industry may be due

as much to a catching up with American management techniques as to the growth in the Canadian market. It is not unreasonable to expect that further gains in this important area will occur as the Canadian economy grows and matures, and as the flow of management information back and forth across the border continues to increase. Canadian labour, while perhaps less materialistic and driving than United States labour, otherwise appears not very different in skills, effort and attitudes. Having in mind the close links between the two economies we would expect any small differences that now exist to narrow in the future. It was noted earlier that, given this approximate equality in labour effort, the 25% differential in wages has been an important factor enabling Canadian secondary industry to offset our productivity disadvantages. Any future change in the disparity between over-all levels of wages will tend broadly to reflect relative changes in output per man in the two countries. As we have concluded that productivity in Canadian secondary industry will continue to show some slight improvement relative to the rest of the economy (see Chapter 9), and also to its counterpart in the United States, we expect that any narrowing of the wage differential that occurs in this sector will tend to follow, but not entirely outweigh, improvements in the productivity and costs of Canadian secondary industry with respect to their American competitors.

The discussion up to this point has centred around the factors which are likely to influence the competitive position of Canadian secondary industry in relation to United States imports. In competing with overseas countries the principal disadvantage of a number of labour-intensive, low-productivity Canadian industries will continue to be not volume of production but differences in wages. As has already been pointed out Canadian output per man-hour in secondary industry, although lower than that of the United States, is substantially higher than that of overseas countries, a fact which enables most of our manufacturing industries to overcome the large wage disadvantage with those countries. Although the gap between North American and overseas wages has widened since the war, the more rapid rise in secondary manufacturing productivity in this country, based in large measure on high levels of research and capital investment, has caused the proportion of competing imports from low-wage countries to diminish. A reversal of these productivity trends appears unlikely, which means that the thrust of overseas competition will increasingly affect commodities with a high labour content, which are not readily adaptable to mechanized techniques of production, and which are not sheltered from foreign competition by such forms of natural protection as high transportation costs, business and consumer preference for North American-type products, differing engineering standards, speed of delivery and availability of servicing. At the same time, the march of technical progress will tend to leave few products untouched by mechanization because machine-made competing or substitute products will become relatively cheaper. In effect, labour-intensive products will constitute

a relatively less important part of the market for manufactured goods, and the Canadian manufacturers' share of the market for labour-intensive products will decline.

These comments are, of course, more applicable to individual products, or related groups of products, than to entire industries as we have classified them in this study. The production of rubber footwear, for example, constitutes only about 10% of the activity of the rubber manufacturing industry; the rest of the industry has experienced a very healthy growth. While it may be regretted that changes in our industrial structure have to take place, with all their implications for the moving of people from place to place and from occupations for which they have been trained into others requiring new skills, it is part of the price that has to be paid for economic progress and continuing growth. National prosperity must be judged not from the point of view of one industry, but from that of the economy as a whole. In a very real sense the growing problems of the labour-intensive industries are a product of the dynamic nature of the Canadian economy and of the expansion of alternative industries. Wage levels will continue to be pulled upwards by those industries which raise the productivity of their labour force by the introduction of new machinery and manufacturing techniques. Industries which cannot use resources as productively, or in which employees will not accept relatively lower wages, will be forced to raise prices thereby exposing themselves to competition from countries with lower wage levels. The deteriorating competitive position foreseen for the producers of a limited range of labour-intensive products is simply a reflection of the rapidly rising productivity expected for most Canadian secondary industries and indeed for the economy as a whole.

Export Prospects

A third and less important general factor which must be considered in assessing the future of our secondary manufacturing is the prospect for export markets. As we have noted, for secondary industry as a whole export markets have never been very significant in peacetime; in 1955 only 6% of the gross value of production of secondary industry was exported. Even for those few industries which have in the past been substantial exporters, the trend during recent years has been towards a greater dependence on the domestic market because the exchange difficulties of many former customers has led them to impose restrictions and to set up production facilities of their own. As exports are of relatively small importance in most secondary manufacturing, and quite significant in two or three individual industries, we hesitate to generalize about prospective export trends for the group as a whole. Some discussion of exports on a product basis will be found in the Commission's export study and there will be a few references in Chapter 9 of this study to export prospects in those industries where they may be significant. If anything of a general nature can be said, however, it would have to

be that the exchange difficulties of our overseas customers will probably continue, and although possibly somewhat less severe than in the recent past, will not allow for a substantial increase in purchases of manufactures from Canada. Secondly, despite some progress there is little evidence that there will be a basic change in United States attitudes towards imports of manufactured goods, and finally, most Canadian secondary industries will continue to be high-cost producers relative to the United States, in large part because of inability to obtain access on reasonable terms to the United States market.

This rather pessimistic general outlook is tempered somewhat by the prospects for particular commodities, and by the great growth prospects forecast for some of our secondary industries. In the normal course of events this might lead to unexpected export markets for Canadian manufactured products, as has frequently proved true in the past. It must not be forgotten, either, that if further processing of basic export commodities takes place in Canada it will tend to be reflected in exports of the secondary manufacturing sector. While it is unlikely that there will be a dramatic shift towards greater fabrication of such materials by Canadian secondary industry prior to export, our projection allows for a small movement in this direction. Translating this speculation into numbers we venture to predict exports of secondary manufactures of between \$1,700 and \$2,000 million (1953 dollars) in 1980, compared to about \$750 million in 1953. This 1980 total would represent close to 5% of the forecast 1980 gross value of production of secondary industry compared with about 6% today; the proportion of such sales going to the United States could well be considerably higher than it is at present. Of course, were Canadian manufacturers to be permitted freer access to the United States market, thereby reducing their present cost handicap, the exports and production of secondary industry would materially increase. Furthermore, exports of manufactured goods would be increased if Canada should extend in the future a greater amount of aid on a gift or credit basis to under-developed countries or to military allies. While there is no way of measuring the potential scope of such aid, we have felt justified in making a small allowance for it in the export projection.

Summary

In reviewing the general factors which will influence the growth of our secondary manufacturing industry in the future, we have concluded that its dependence on the domestic market will continue to increase. Barring any radical easing of the commercial policy of the United States or overseas countries, export markets will show a further relative decline. At the same time, the absolute growth of the Canadian market will allow secondary industry as a whole to make small improvements in its cost and productivity position relative to the United States, even though the optimum size of the average manufacturing plant in that country will probably continue to in-

crease. The intensified pace of technological change, in its effects on both new products and new processes, will further increase the importance of using the fruits of the latest research and of installing the most modern machinery and capital equipment in secondary industry. We believe that import competition will become increasingly important in a declining number of industries and products in which operations cannot be readily mechanized. However, overseas competition is not expected to increase in the more technically efficient, mass-production industries. On balance, we would expect some small decline in the import share of the market for all secondary manufactured products in Canada, with the proportion of imports supplied by the United States and overseas countries not very different from the present. In summary, we believe that output of Canadian secondary manufacturing industry in 1980 will have grown by two and one quarter times from its 1955 level, as compared to a growth of about 184% in Gross National Product, and will thus account for a slightly larger share of national output in that year. In the next chapter these forecasts are discussed in greater detail, but it might be pointed out here that this growth will be even larger should the G.N.P. increase be more than expected.

PROSPECTS FOR INDIVIDUAL INDUSTRIES AND SPECIAL ASPECTS OF GROWTH

THE PRECEDING chapter considered the general outlook for Canadian secondary industry and reviewed the factors likely to affect its growth. This chapter brings these general criteria down to an industry level, and provides some numerical guesses about output, productivity and employment for individual industries and for the sector as a whole. In addition there is a discussion of three other important aspects of secondary industry development—regional growth, capital investment, and requirements for skilled workers. It is perhaps unnecessary to reiterate that quantitative estimates of the size or shape of secondary industry in 1980 should be viewed with considerable scepticism. Short-term economic forecasting is a long way from being a science, and the record of long-term forecasting suggests that the one certain thing about such forecasts is that they will prove wrong. Nevertheless, it is felt that the setting down of a series of numbers results in a somewhat more disciplined approach to forecasting than would otherwise be the case. If the numbers are not too significant, the process of arriving at them has required a considerable amount of speculation and discussion about the growth prospects of secondary industry in general and about the individual industries in particular. Enough of the forecasting process is shown so that anyone questioning the results may re-do the calculations with his own set of assumptions.

The Forecast

In summary, the output of Canadian secondary industry in 1980 as foreseen by us will account for 23.3% of total output in the economy, slightly above the 1953 percentage of 21.8% and the 1955 proportion of 20.4%. With an anticipated annual rise in output per man-hour of close to 3¼% in secondary industry, and with an assumed 18% decline in hours worked, employment would increase from 1.1 million persons in 1953 to about 1.9 million persons in 1980. This latter total, however, represents a slightly smaller share of the

1980 labour force, about 20% compared with 21% in 1953. These output and employment estimates indicate that secondary industry will continue to grow over the long run at a somewhat faster pace than the economy as a whole. It should however be noted that the figures suggested for 1980 are to be regarded as the middle of a range of possible figures, not as precise estimates. The detailed projections of output on an industry basis are contained in Table J, and of employment in Table K; both Tables will be found at the end of this chapter. The reasons for the choice of specific growth and productivity assumptions follow in the text in the brief analysis of each industry's outlook.

Table J shows for each of the industry groups and important sub-groups listed in Appendix A, the gross value of production (G.V.P.) for 1953, the latest year for which complete statistics were available. To obtain the estimate of G.V.P. for 1980, the 1953 G.V.P. figure for each industry was multiplied by an estimate of the expected increase in the industry's output by 1980. This growth factor, as it is called in the table, took account of estimates given in industry studies, in the submissions, and in the testimony at the hearings, but in the last analysis represented the judgment of the writers. The growth factor was also applied to the value-added and the Gross Domestic Product (G.D.P.) for each industry. With respect to value-added, this calculation will of course only be valid if the 1980 relationship between it and the G.V.P. is the same as it was in 1953. During the past 30 years the trend towards economy of materials and the increasing complexity of manufacturing processes has tended to increase the ratio of value-added to gross value. However, this trend has apparently been offset by increased shipments between industries, and value-added throughout this period has in consequence remained relatively constant at slightly under 50% of G.V.P.¹ Further changes in industry structure and in the inputs of labour, capital and materials may be expected to occur, but there appears to be no reason for forecasting any appreciable change in the future relationship between the two measures of output. Since the growth factor is in effect a net production index it would also appear reasonable to apply it to the 1953 G.D.P. figures to obtain G.D.P. estimates for individual industries in 1980.

The total of these calculations for individual industries yielded the forecast volume of output for the secondary industry sector as a whole. Some allowance was made in the "Miscellaneous Secondary Manufacturing" group for new industries not encompassed within the framework of the existing classification, or allowed for in the individual industry projections. The results are summarized as follows:

¹If, for example, a firm now purchases parts formerly made in its own industry from another industry, this leads to double-counting in the gross value of production (the parts are included in the gross output of both industries) but it does not alter the total value-added.

	1953	1980	Percentage ² increase
	(\$ millions)		
Gross Value of Production (\$ 1953)	\$12,290	\$40,725	231%
Value-added (\$ 1953)	\$ 5,975	\$19,650	229%
Gross Domestic Product (\$ 1949)	\$ 4,015	\$12,900	221%

The most satisfactory way of linking forecast secondary industry output to the total output foreseen for the economy is by a comparison of the G.D.P. for secondary industry and G.D.P. for the economy as a whole. This is summarized in the following table.³

	1953	1980
	(\$ 1949 millions)	
G.D.P.—secondary industry	\$ 4,015	\$12,900
G.D.P.—total economy	\$18,341	\$55,395 ⁴
Secondary industry G.D.P.		
—as proportion of total G.D.P.	21.8%	23.3%
—as proportion of G.D.P. (ex. rents and armed forces)	23.2%	25.3%

Table K provides estimates of employment in each group and important sub-group in secondary manufacturing for the years 1926, 1939, 1953 and the forecast for 1980. As explained earlier, there are two different methods of computing employment in secondary manufacturing industry, the Census of Industry series and the Labour Force data. The 1980 calculations for individual industries are derived from the Census of Industry figures; for purposes of comparison with other sectors a Labour Force total has been calculated on the assumption that it will remain at about 105% of the other employment figure.

The 1980 projections are obtained by applying estimates of output, productivity and hours of work to the 1953 employment figures. The output forecasts contained in Table J will only yield corresponding increases in employment if hours of work and productivity (real output per man-hour) remain the same. It is therefore necessary to deflate the expected increase in output to allow for the projected annual increase in productivity over the period. As indicated earlier, current productivity data are not very trustworthy in aggregate, and less so on an individual industry basis. Trends in the early postwar period are distorted by the readjustment to the peacetime economy and by strong inflationary pressures; the performance of the '30's is affected by the depression, and the statistical data, particularly the employ-

²The variation in the results occurs because of the different weighting implicit in the three methods of measuring industry production. Many of the industries with a high growth factor have a relatively low G.D.P./G.V.P. ratio.

³A fuller description of the G.D.P. projections is contained in *Output, Labour and Capital in the Canadian Economy*.

⁴This G.D.P. figure assumes 75,000 annual immigration and is based on an average of the two productivity assumptions for the private economy of 2.5% and 3.25% per annum compounded.

ment series, are suspect; 1926-29 is the only prewar period comparable to the past decade (and to our assumed full-employment future) and the statistics for that period have so many deficiencies that any conclusions about productivity based on the '20's cannot have much force.

Our productivity assumptions have therefore been based on three sources, roughly in order of importance:

- (a) The performance of each industry since the war with particular importance attached to its record since 1949;
- (b) Guesses about future productivity in the studies and submissions;
- (c) The long term trends, 1926-1955.

The productivity estimates are shown in the table as a per annum rate of increase; this rate is compounded for 27 years and the reciprocal used as the employment deflator. Needless to say, these productivity projections are little more than careful guesses, and should be used cautiously.

In estimating the effects of changes in the work week we have followed the Commission forecast which predicts a decline in the hours worked in the private non-agricultural economy from 41.7 hours per week in 1953 to 34.3 hours in 1980. Although obviously this 18% decline would not apply equally to all secondary industries, there seems to be no clear basis for forecasting any change in present differences between industries in weekly hours of work; the percentage reduction is therefore assumed to apply equally to all. The shorter work week requires more employees to achieve the same output; employment estimates obtained by projecting output and productivity assumptions are therefore increased by a factor of $1.216 (41.7 \div 34.3)$.

This approach yields estimates of 1980 employment in the various industries which add up to 1,811,000 persons on a Census of Industry basis or 1,907,000 persons on an equivalent Labour Force basis. Using the latter figure, employment in secondary manufacturing would be 19.8% of the projected 1980 employed civilian labour force, roughly the same percentage as in 1955 but below the 20.8% share of total employment in 1953. As we have suggested, these figures are subject to considerable error, particularly with respect to the productivity aspects of the forecast. For example, if productivity in the clothing industry were assumed to rise at 1% per annum instead of 2%, the calculations would indicate an employment figure for the industry some 60,000 higher than the 192,000 now forecast. Yet such a low rate of increase in productivity would not normally be consistent with a forecast of a reasonable increase in output; the clothing industry would be unable to compete for labour with higher-productivity industries without raising its prices. An increase in prices would adversely affect the demand for clothing and the share of the market obtained by Canadian manufacturers.

In the circumstances we incline to the view that growth of an industry, and possibly even its survival, will depend upon it attaining a level of annual productivity increase not very far below the rate achieved by the economy as a whole unless it is almost completely shielded from domestic or foreign competition by natural protection or by government policy. The pressures of competition, of course, tend to bring about such productivity increases by increasing the incentives to achieve a higher output per man-hour through mechanization. Moreover, those segments of an industry which can improve their productivity and competitive position by the use of new equipment and manufacturing techniques will be able to expand while the less dynamic segments of the industry will tend to lose ground. For these two reasons we have assumed that, with the exception of shipbuilding, the minimum annual increase in productivity that any secondary industry as a whole will achieve is 2%.

If we have set a productivity floor it would seem equally logical to assume some kind of a ceiling on the amount of productivity increase that could be achieved by any one industry. Most industries will continue to produce some commodities which are not easily adaptable to mechanized manufacturing processes and which will pull down the industry average. In addition even the most technically advanced industries, such as oil refining and chemicals, find that economies in the use of production workers tend to be in part offset by a greater need for skilled clerical help for production programming—or even for guides to show the plant to admiring visitors! There has in fact been a continuing rise in the proportion of salaried employees in the past, and for this reason it has been assumed that the maximum rate, (applicable to the petroleum products industry) will be 5% per annum.

The average rate of annual increase in productivity for secondary industry as a whole, derived from a summation of individual industry calculations, works out at about 3.2%. This is somewhat higher than the average of the high (3.25%) and low (2.5%) assumptions about productivity for the private non-agricultural economy which are used in the preparation of the Commission's G.N.P. forecasts. It is, however, consistent with them. Higher than average productivity in the extractive and manufacturing sectors offsets the lower rates characteristic of transportation, construction and the service industries. The rate for secondary manufacturing also appears reasonable on the grounds that the greatest expansion will occur in the higher productivity industries; this change in the structure of secondary industry, as in the case of changes in the product-mix within an industry, will tend to raise the average rate of increase for the sector as a whole.

Individual Industry Commentary

The following notes are an attempt to summarize very briefly the reasons for the selection of output and productivity assumptions for the various in-

dustries given in Tables J and K. In view of the number of industries on the list, only very abbreviated comments are possible. It must however be confessed that brevity may in some instances indicate that little information is available on which to base projections. For purposes of establishing a standard of comparison for individual industries, it might be noted that the percentages of growth forecast for population, G.N.P. and secondary manufacturing output between 1953 and 1980, are respectively 81%, 204%, and 231%.

The following comments apply to industries as they are today. With boundaries between industries becoming increasingly blurred it may be very difficult in 1980 to distinguish between industries much as it is difficult today to decide whether the production of cellulose acetate forms a part of the chemical, textile or pulp and paper industry. Similarly firms now largely in one industry, such as railroad equipment, may be producing industrial machinery or other iron and steel products by 1980. For this reason, but also because firms in an industry may grow at a different rate than that forecast for the industry as a whole, the analysis is not necessarily applicable to individual firms.

Bakery products

Our forecast of a doubling of output assumes consumption linked more closely to population than to income, with items other than bread showing the highest gains and imports negligible. The productivity estimate of 2½% is higher than recent Canadian experience, but below the estimated United States rate of 3½% per annum for the 1949-53 period.

Beverages

Half of the industry's output comes from breweries, one-quarter from distilleries and the balance from soft drink and wine producers. Demand for alcoholic beverages is mainly determined by adult consumption per capita and is expected to rise at a rate between that of the population and incomes. The Canadian share of the market is expected to increase slightly, but exports are not expected to rise as fast as G.N.P. If we allow for a somewhat faster rate of growth for non-alcoholic beverages, which are exclusively related to the domestic market, an increase of 175% in output for the group appears reasonable. Productivity gains in recent years have been high, according to our estimates over 5% per annum for the past six years. This has been a period of rapid modernization in many parts of the industry, notably the breweries. This is expected to continue, if perhaps not at the same pace, and the slightly lower rate of 4½% per annum has been projected.

Miscellaneous food products

This group includes sugar refining, confectionery, and a wide range of manufactured food products such as baking powder and macaroni. Output

is expected to rise at a rate between population and G.N.P., but in view of the heterogeneous mixture of products in this group no detailed analysis is possible. As for productivity, these industries are fairly capital-intensive, and a figure of 3% per annum has been used.

Tobacco products

Output is expected to increase about 150% as per capita consumption is still rising, in spite of the health issue, and there has been a long-run growth trend. Furthermore, the swing to finished cigarettes from cut tobacco is continuing, which will tend to raise the industry's value of production in relation to total tobacco consumption. Output per man has risen at a very high rate during the post-war period, due to intensive mechanization; the rate in fact has rivalled that of petroleum refining—about 7% per annum. Despite this we feel that further spectacular gains in productivity will be more difficult to achieve (some of the recent gain presumably being due to use of idle capacity), and the rate selected is 4%.

Rubber products

The industry's brief⁵ estimates an increase in tire sales, which now comprise about half of the industry's production, of 4.2% per annum. Since the proportion of rubber products other than tires is constantly increasing, and the demand for these products as a group is rising faster than for tires, a rate of growth for the whole industry of 5% per annum appears reasonable (although somewhat lower than postwar experience). At the same time, the unfavourable outlook for domestic rubber footwear production indicates how prospects for a segment of an industry can differ widely from that of the balance of the industry. Nevertheless, allowance is made for some decline in the import share of the market for products other than footwear in the above growth rate, which suggests an over-all increase of 275% in the output of the industry as a whole by 1980. Productivity increases have been running about 4% to 5% per annum between 1949 and 1955; 4% is used in the projection.

Leather products

The most important segment of this industry is shoe manufacturing, and a rise in the per capita shoe consumption from two and a half pairs in 1956 to three pairs in 1980 is forecast.⁶ Accepting this, and allowing for a swing to the use of plastics and other leather substitutes in shoes as well as in other sections of the industry, an increase in output of 150% appears appropriate. As the industry is not optimistic about its ability to mechanize rapidly, despite recent gains we have used a productivity figure of 2% and have allowed for no change in the import share of the market.

⁵Brief submitted to the Commission by the Rubber Association of Canada, pp. 10, 63-68.

⁶Brief of Shoe Manufacturers Association and Hearings, Ottawa, March 1, 1956, p. 8033 et seq.

Textiles

The study prepared for the Commission⁷ estimates that the Canadian market for domestic textile producers will increase at an annual rate of between 3% to 3½% per annum, on the basis of various assumptions about demand for clothing and other textile products as well as the share of the market which Canadian manufacturers will obtain. The average of the forecasts represents an increase in output of 140% between 1953 and 1980. The industry's submission suggests a somewhat comparable increase.⁸ One of the firms in the industry estimated a doubling of current consumption by 1980, with the bulk of the increase occurring in synthetic fibres.⁹ Taking these and other industry forecasts into account we believe that the 1980 market will be more than double present levels, but that inability to mechanize some labour-intensive processes rapidly enough to offset widening wage differentials with overseas countries will lead to some reduction in the share of the market held by the Canadian industry, even though the share of the market obtained by American imports may fall. The net increase in output is therefore put at 100%, but as in other instances the outlook for individual products will vary widely, with the prospects for producers of synthetic fibres being considerably more favourable than for either the cotton or woollen sections of the industry.

Increases in output per man-hour have been running at a rate slightly above 3% per annum since 1947. In view of the fact that much of the industry's growth is expected to occur in synthetic fibres, the production of which is capital-intensive, we have used a productivity figure of 3% per annum. (The textile study is more conservative, suggesting 2%).

Clothing

Based on projections of income, population and family size, we estimate the demand for clothing at 2¼ to 2½ times the present level (see reference in preceding section). The clothing industry, although labour-intensive, is by its nature somewhat less exposed to foreign competition than the primary textile industry, and the forecast increase in domestic output is slightly higher than that for primary textiles, 125%. On the other hand, the fact that the industry is less susceptible to mechanization suggests that a fairly low productivity figure is appropriate, and 2% has been used in the projection. These output and productivity estimates yield a total employment of 192,000 in 1980 compared with 120,000 in 1953.

Furniture

Although expenditures on furniture are expected to increase at a rate not much below that of the G.N.P., the bulky nature of the product, involv-

⁷Op. cit., pp. 92-94.

⁸*The Outlook for the Canadian Textile Industry.*

⁹Courtauld's submission to Commission and Hearings, Montreal, February 20, 1956.

ing high costs of transportation, warehousing and distribution may tend to reduce the proportion of the final selling price accruing to the manufacturer. (Productivity in these services will increase at a slower rate than in manufacturing). Factory output is therefore expected to increase by only perhaps a little more than 125%. Since it is a labour-intensive industry, without much prospect of rapid mechanization, the rate of productivity increase is set at 2% per annum.

Other wood products

This group, which has been relatively slow-growing, comprises the manufacture of a wide range of wood products such as boxes, barrels, and morticians' goods. In many products wood is being replaced by plastics and other substitutes and a dynamic expansion of this industry cannot be foreseen. In fact, our growth and productivity assumptions are the same as for furniture, 125% increase in output, and a 2% per annum rise in productivity.

Secondary paper products

The Canadian Pulp and Paper Association¹⁰ forecast an increase in tonnage of the order of 140% for papers used by the secondary paper products industry, while a company brief suggests that consumption of secondary paper products will triple.¹¹ The bare tonnage figures do not allow for an increased manufacturing content, and the estimate of a 200% increase therefore appears reasonable. Since this industry is fairly capital-intensive, and is susceptible to improvements in machinery and processing techniques, 3% per annum is considered a reasonable figure for the annual increase in productivity.

Printing and publishing

The industry has grown in the past at about the same rate as the G.N.P., and there is no reason for assuming any different rate of increase in future. Recent improvements in productivity have been of the order of 3% per annum, and this figure is used in the projection.

Agricultural machinery

The Commission study forecasts a rate of increase in output somewhat below that of the G.N.P. on the basis of expected demand in Canada, United States and overseas countries. The submission of Massey-Harris-Ferguson Limited supports this conclusion, suggesting a 112% increase in output by 1975. Farm output in North America is expected to rise at a slower rate than the G.N.P., and the rate of mechanization may slow down somewhat. Therefore the increase in output allowed for is 125%. Recent productivity

¹⁰Submission of Canadian Pulp and Paper Association.

¹¹Brief of Bathurst Power and Paper Company.

trends are obscure because of substantial underemployment of the industry's facilities, but 3% appears to be not an unreasonable figure for this fairly mechanized industry.

Industrial and household machinery

The Commission study of industrial machinery forecasts an output in 1980 of four to five times the present level, due to increasing use of machinery in production processes and to an expected acceleration in the rate of obsolescence. A small increase in share of the market is also anticipated. As the demand for household, office and store machinery is expected to rise at a rate not much faster than the G.N.P., the projected increase for the machinery sector as a whole is 325%. Since a substantial proportion of Canadian industrial machinery output consists of custom built machinery, labour content is fairly high, and productivity improvements will not be easy to achieve. Although household machinery production is more susceptible to mechanization, the over-all productivity rate has been set at the conservative figure of 2%. This might seem at first sight to contradict the main theme of this report, namely that high productivity and large increases in output are closely related. However, productivity gains in the American industry, the main source of competition, have also been relatively low; the forecast rate for Canada does not therefore mean that there will not be some improvement in the competitive position of the domestic industry. In addition, the importance of designers and technicians familiar with Canadian conditions, of on-the-spot advice and parts, and of fast repairs and service, will tend to hold down the market share of overseas competitors despite an anticipated widening of wage differentials.

Primary iron and steel

The Commission study of this industry suggests that Canadian steel consumption in 1980 will be somewhere between 14 and 18 million tons, and, assuming a continuation of the recent decline in the import share of the market, output might be of the order of 12 to 14 million tons, compared with 4½ million tons in 1955. These figures are in line with the rate of growth in steel production over the past quarter century which was somewhat higher than that of the G.N.P. However, the forecast in the study has been based on a lower estimate of 1980 G.N.P. than the median Commission forecast. Taking this latter factor into account, and allowing for increased manufacturing content per ton through a greater concentration of output in more complex products, an over-all increase in the constant dollar value of net output of 300% appears reasonable. Recent increases in productivity have been of the order of 3% but technological improvements now being introduced or in prospect suggest that a somewhat higher rate might be achieved. Consequently 3½% per annum is used in the projection.

Other iron and steel products

The assessment of prospects for this important but heterogeneous group of industries, which includes the production of structural steel, iron castings, sheet metal products, wire and boilers, presents some problems. Growth in the past eight years has been about the same as in the primary iron and steel industry. However, a comparable increase in the share of the market is not expected, and we have therefore settled on an increase of 250% although there will be wide variations within the group. Most products are of a type suitable for mass-production techniques, and hence a 3% per annum increase in productivity would not appear out of line.

Motor vehicles and parts

The Commission study of the Canadian automotive industry forecasts that the annual number of automobiles manufactured in the five-year period 1975-80 will average 130% higher than in 1955, and the production of trucks about 150% above 1955. This will represent 2.4 persons per motor vehicle in 1980 compared with 4 persons in 1955. If allowance is made for a steady upgrading in the average quality of automobiles and trucks and for a higher content of Canadian parts, the projected increase of 175% is not unduly high. Recent productivity gains in the industry have been substantial. The study suggests, however, that this rate will not be maintained and that, depending upon the level of Canadian content, employment in the industry in 1980 will be somewhere between 80,000 and 95,000 persons. Our estimate is 85,000 based on an annual rate of increase in productivity of 3%.

Railway rolling stock

Production of freight cars is expected to increase at about the rate predicted for railroad revenues (75% by 1980). Current production of diesel locomotives may be abnormally high in terms of future demand, however, due to the replacement of steam locomotives by diesels, and the forecast 75% increase in output by 1980 may be optimistic. Some firms in the industry are shifting part of their facilities into the production of industrial machinery and other iron and steel products, and the rate of increase forecast does not allow for such diversification, although provision for it is made under other appropriate industry groupings. Productivity has been rising in the industry with further mechanization, and as there is at present some excess capacity in the industry a rate of 2½% was chosen.

Shipbuilding

This industry, like the aircraft industry, is based primarily on defence contracts, and its main civilian functions in future are likely to be the building of ships for the Great Lakes and repair and maintenance. It is a labour-intensive industry with little apparent prospect of obtaining significant gains

in productivity from mechanization, and therefore it will tend to be at an increasing cost disadvantage relative to overseas countries. Output is somewhat arbitrarily assumed to rise 50%, and an increase of 1½% per annum is allowed for in productivity.

Aircraft and parts

The Canadian aircraft industry owes its continued existence to the demand for military aircraft, and its further growth will probably still be largely determined by future levels of Canadian defence expenditures. The size of the prospective domestic market for civilian aircraft is relatively small, although if by 1980 the small helicopter has begun to replace the automobile as the principal means of private conveyance, the industry's growth may be entirely different than that pictured here. Although large orders have been obtained by Canadian producers from time to time, all governments are reluctant to place large orders for military or transport aircraft in other countries. Moreover, economies of scale are so important in this industry—and becoming more so—that the Canadian industry, because of the relatively small domestic market, is likely to remain at a considerable competitive disadvantage. On the assumption that Canadian government defence expenditures in 1980 will be slightly less than double the 1953 level, but that the aircraft and guided missile share of these expenditures will rise, we have projected a 100% increase in output. Productivity increases have been arbitrarily set at 2½% per year—there is no way in which the past performance in productivity can be measured satisfactorily because of wide fluctuations in output and the large amounts of pre-production expenditures required before a new model can be manufactured.

Other transportation equipment

This is a relatively small sector of secondary industry, much of it of a semi-handicraft nature; it includes small boats, the demand for which is rising rapidly. Output is estimated to triple, but productivity gains of only 2% per annum are expected in view of the nature of the industry.

Non-ferrous metal products (secondary)

This industry group includes fabrication of metal products but not smelting and refining, which is classed as primary manufacturing. According to an industry estimate, the aluminum products industry is expected to increase fivefold by 1980. Since production of other non-ferrous metal products taken together is expected to rise at the same rate as G.N.P., the group as a whole will show an increase of 275%. Although recent productivity gains have not been high, there is evidence that mechanization is increasing, and a rate of 3% per annum in productivity has been used.

Non-metallic mineral products (secondary)

The non-metallic group has been rather arbitrarily split between primary and secondary manufacturing, with the secondary sector composed largely of building products. Estimates of the growth in construction by the Commission staff and by those in the building products business suggest something better than a doubling of present activity by 1980. Assuming that asbestos and glass products, which have other markets than construction, increase at a somewhat faster rate, the output increase for the group as a whole is estimated at 150%. Rates of productivity increase will vary widely between the industries in the group, which are both capital- and labour-intensive, and a 2½% per annum increase has been selected.

Electrical apparatus

This industry grouping, which includes electronics, has experienced a very rapid growth since the war, about 10% per annum in output. The rate of growth is closely linked with consumption of electric power and sales of domestic appliances. The Commission's energy study forecasts an increase of 7% per annum in power consumption which would mean better than a 500% increase by 1980. Although the Commission studies of the electronics and electrical manufacturing industries support an expansion in industry output not very different from this, we have used the slightly more conservative figure of 450%. Both estimates allow for a continued increase in the share of the market obtained by domestic producers. Exceptions to this are labour-intensive products not requiring Canadian design and service skills, such as some types of generating equipment, and a limited number of mass-produced commodities such as receiving tubes where new technical advances may increase the existing cost advantage in favour of the United States producer. The electrical manufacturing study suggests a figure of 3% for the rate of increase in output per employee, which allowing for the expected reduction in hours worked is roughly equivalent to the 3½% per annum used in the projection. Total employment in 1980, on the basis of these calculations, would be 203,000 against the study's suggested 210,000, the largest in the secondary sector.

Petroleum and coal products

Oil refining is the important industry in this group, and output in 1980 will be determined largely by domestic demand for gasoline, oil and other refinery products. The Commission's energy study estimates the demand in 1980 at about 3¼ times current consumption. Allowing for some upgrading of products manufactured—higher octane gasoline, more complex by-products, etc., and for a decline in the import share of the market, and considering the 10% per annum increase in output since the war, it was felt that a somewhat higher rate was justified; an increase of 300% was allowed for

in the projection. Productivity gains in recent years have been very high—around 8% per annum—but for various reasons the Canadian industry had not been as advanced technologically as in the United States and some of these productivity gains were of a non-recurring nature. In the circumstances an annual rate of productivity increase of 5%, highest in the secondary industry sector, was used.

Chemicals (secondary)

The 1980 output of the entire industry, primary and secondary, is forecast in the Commission study of the industry at six times output in 1955, underlining the importance of chemicals as a dynamic and technologically progressive industry. However, secondary chemicals are largely consumer products and have been growing at a slower rate than primary chemicals, and an increase of 400% is allowed for in the projection. The industry has an excellent productivity record based on continuing research and on mechanization. The recent rate of about 4% per annum is projected for the future.

Miscellaneous manufacturing

This group, which includes the output of such varied products as scientific equipment, sporting goods, electric signs, clocks, brooms and candles has shown a fairly rapid rate of expansion over the past few years, due as much to the accretion of new industries to the group as to the expansion of older industries. An output increase of 400% is forecast for these miscellaneous industries, which will in part cover new developments in manufacturing not provided for under individual industry headings. Since there are some handicraft industries in the group, the rate of productivity increase is assumed to be 2½% per annum.

Summary

It is apparent from this very brief review of industry prospects that there will be wide variations in the rates of growth of different industries and indeed in the output of individual products. The pattern of future development, not unnaturally, is expected to be much the same as in the recent past although the pace of technological advance may increase still further. In any event, the faster-growing industries will tend to be relatively capital-intensive and technologically complex and to be characterized by the development of new products, by a high rate of annual increase in productivity, by a rapidly growing demand for their products, and in general by an improvement in their share of the domestic market. Some of these industries, such as chemicals and electrical equipment, in fact appear to have a special dynamic which will enable them to create new markets as well as new products and thereby to assure their own rapid growth. On the other hand, industries with a slower prospective rate of growth tend to be more labour-intensive and to

be characterized by lower rates of productivity gains which will expose them to increased foreign competition. However, for some industries which are expected to show a relative decline, such as agricultural implements, a stable or declining relative demand for their products may be more important than a declining share of the domestic market. More detailed forecasts of markets and sales of various secondary industries will be found in other Commission publications.

Regional Growth

As already noted, about 87% of Canadian secondary industry is concentrated in Ontario and Quebec, and almost all of it in a narrow, 600-mile long strip of land running from Quebec and Sherbrooke on the northeast to Windsor and Sarnia on the southwest. Moreover, there has been little change in the extent of this concentration, at least in this century. While we have heard much about decentralization of manufacturing during recent years, it would appear that most of it consists of plants moving from downtown Toronto to Scarborough or to Barrie, and from Montreal to Pointe Claire or to Cornwall, rather than a shift out of the main industrial regions of the central provinces. In the course of the preparation of this study, and of related studies, there has not been time to take more than a superficial look at the future regional pattern of secondary industry's growth. However, the hearings, the briefs, the studies and the judgments of most observers suggest that little change will occur in the location of manufacturing industry and that any change which does take place will be towards a greater degree of concentration, rather than the reverse.

In the first place, secondary industries will continue to be market-oriented, and located as close as possible to the centre of the Canadian market. In 1956 the proportion of the population in Ontario and Quebec was about 62.3% and by 1980 it is expected to exceed 65%. Population growth and industrial growth will of course reinforce each other in the years ahead. Secondly, the supply of skilled labour will be an increasingly important factor determining the location of industrial growth. There is some evidence that this factor is contributing to the agglomerative process by which the metropolitan areas of Toronto and Montreal are growing at a rate much faster than the country as a whole, and faster even than the central provinces in which they are located. These areas have available supplies of almost all the types of skilled labour required by modern industry and also tend to attract additional manpower which will provide the main sources of industrial skills in the future. These areas also tend to be the headquarters for most of the firms supplying specialist engineering and technical services. As the need for skilled labour and advisory services grows so will the attractiveness of the large metropolitan areas for the manufacturer, despite such offsetting disadvantages as higher wages and traffic congestion.

The location of Canadian secondary industry will also be affected by the continuing links between it and industry in the United States. Many Canadian manufacturers, dependent upon their United States parent or affiliate for a supply of parts or for management and technical consultation, will continue to prefer southern Ontario and Quebec because of their nearness to the principal industrial centres of the United States. Moreover, once a firm is well established in an area (usually for sound economic reasons) not only is future expansion of the company more likely to occur there than elsewhere, but other companies in the same industry are attracted to the area. The locational pattern of most Canadian secondary industries, in fact, appears now to be fairly well established, and although the growth of regional markets may permit some increase in decentralization the prospective Canadian market will not be large enough to permit the hiving off of industry to the same extent as that which has already occurred in the United States.

An examination of the growth prospects of a few of the more important secondary industries tends to support these general impressions. For example the Commission study of the automotive industry suggests that future expansion will occur largely or entirely at present locations. The study of electrical manufacturing also states that any change from the present pattern of concentration in Ontario and Quebec in future is unlikely. Similarly the agricultural machinery study suggests that further expansion of that industry will take place at existing plants. The study of the primary iron and steel industry also supports the view that much of the expansion in prospect over the next 25 years is likely to take place at established plants or in the Montreal area. However, in this industry technological changes which make possible smaller scale operations may permit the development of an integrated steel industry in British Columbia and possibly on the Prairies. The president of a large chemical firm,¹² after noting that the chemical industry is now heavily market-oriented and is concentrated almost entirely in Ontario and Quebec, also predicted that new chemical plants may tend to be more widely dispersed across Canada. However, he believed that the dispersion will be associated largely with natural resources development and with heavy chemicals—products which, by our classification, fall mainly into the category of primary manufacturing industry.

For products with high transportation costs relative to value and in which economies of scale are less important—those essentially local industries such as bakeries, breweries, and oil refineries—future expansion can be expected to continue to reflect population distribution. In a similar position are some of the secondary industries of British Columbia, which are protected to a degree from eastern Canadian competition by distance and transportation costs. One would therefore expect to see a considerable growth of secondary

¹²*Hearings*, Montreal, February 23, 1956, pp. 7096-99.

industry in the Vancouver area, particularly in view of the very rapid increase in population forecast for the province. It is difficult to be as optimistic about the prospects for secondary industry in the Prairies and the Maritimes, in view of the expected slower rate of population growth in those regions, and their comparative proximity to Ontario and Quebec manufacturers. Exceptions to this trend of course, will be regional manufacturing specialties and those secondary industries dependent upon and located close to the supply of a natural resource; for example, Edmonton will gain from the expansion of secondary industries linked to oil and gas.

Capital Investment

There are few estimates in the studies or the briefs of the amount of capital investment that will be required by secondary industry over the next quarter century. The very tentative figures for investment suggested here are based essentially on the theme running throughout this study, that high productivity industries will tend to be the fastest-growing and that productivity gains are mainly obtained from the introduction of better machinery and equipment. Indeed, for those industries which are not shielded from foreign competition, large and continuing capital expenditures seem almost a condition of survival. We therefore conclude that total machinery and equipment expenditures for the sector will rise at a faster rate than output, as each industry becomes more capital-intensive and as the industry structure changes to give greater weight to the more capital-intensive industries. Expenditures on buildings, however, are not expected to rise as rapidly as on machinery due to a much slower rate of obsolescence. The Commission study *Output, Labour and Capital in the Canadian Economy* suggests that although total Canadian expenditures on machinery and equipment will rise by 280% between 1955 and 1980, expenditures on business structures in 1980 will only be 120% higher than they were in 1955. The combined increase forecast is 205%, compared with a rise of 184% in the G.N.P. for the same period.

The ratio between capital expenditure and output of secondary industry over the past eight years seems to support the conclusion of a trend towards a higher investment-output ratio, although the period is too short for much weight to be given to the figures. As already noted, in the four years 1948-51 new capital expenditures were 4.2% of output; in 1952-55 the percentage had risen to 4.9 and in 1956 appears to have risen even more. In 1953-55 average capital expenditures for the secondary industry sector, including an allowance for capital items charged to operating expenses, amounted to about \$580 million. If the capital expenditure for each industry is projected forward to 1980 on the basis of the estimated growth factor for that industry (see Table L), the 1980 group total would be close to \$2,100 million. This figure is 5.1% of projected 1980 output of \$40.7 billion; it represents an

increase of 257% from the 1953-55 average, compared with a 231% increase in output of secondary industry between 1953 and 1980.

This method of calculation allows for the shift expected in the industrial structure; it may not make adequate provision for increased capital-intensity within each industry. However, the result of the calculation includes construction as well as machinery and equipment, and the much slower rise anticipated for construction expenditures would serve in part to offset a higher rate of expenditure for machinery and equipment. Moreover, there will undoubtedly be gains in the efficiency of capital; with greater volume of output and improved techniques a given amount of investment will produce more in 1980 than it does today. On the other hand machinery may have a shorter life, with more of it consumed in the productive process. It is impossible for us properly to evaluate and weigh all these conflicting factors, and the projection based on output seems as good a guess as can be made in the circumstances. Using this \$2,100 million figure as the estimate for capital investment in secondary industry in 1980, the total of such expenditure between 1956 and 1980 would approximate \$33 to \$34 billion. If, as during recent years, not far short of three-quarters of new capital expenditures are financed internally out of profits or depreciation reserves, the net new outside capital required over the period would be of the order of \$10 billion.

Requirement for Skilled Manpower

The mechanization and growing capital-intensity which will accompany the expansion of secondary industry, together with the increasing complexity of machinery and of the electronic devices which regulate it, inevitably will result in a continuing rise in the demand for labour with specialized skills and for trained management personnel. The progress made by industry will increasingly depend on the application of scientific advances to new products and production methods, which in turn involves an increasing proportion of administrators, scientists, engineers, technicians and skilled tradesmen in the labour force. This trend has been apparent for some time; in the 20 years between 1931 and 1951, the skilled worker component of the labour force increased from 10.3% to 14.2%. The exact proportion in future cannot of course be accurately foreseen as production processes and labour and management skills are to some degree adaptable to shortages and surpluses of the various factors of production.

Although there has been little evidence that shortages of skilled labour and management have yet interfered greatly with production (shortages of many things appear in periods of prosperity) the testimony at the hearings, and the views expressed in the industry studies and in the briefs, indicates

a growing apprehension about the future supply of trained persons. Much of the concern is for the next five or ten years rather than for the long run. Annual additions to the labour force in this period will be relatively low, reflecting the low birth rates of the prewar and early war periods. University graduations are not expected to increase much over this period for the same reason, although more people of the university age group are receiving professional training. The rate of immigration of skilled workers is expected to fall sharply; although immigration of professional workers may remain at present levels, emigration of these is expected to increase.¹³

How severe such a shortage will be will depend largely on the measures taken to alleviate it on both sides of the supply-demand equation. There have been some suggestions that industry has not been making the best use of its skilled people, particularly its engineers. The president of Canadian General Electric stated at the hearings:¹⁴

“I think we have tended to dissipate much of the energies of technical people by having them in abundance and using them to do a great deal of clerical and routine jobs rather than to relieve them of that and give them laboratory and technical assistance”.

It has also been suggested that lower pay and the comparative lack of research in Canada makes employment in the United States more attractive and rewarding for executives as well as for technical personnel. In addition, there are grounds for believing that industry's training programmes to develop skilled workers and future managers are inadequate in some respects and that businesses have not given financial assistance to the universities and technical colleges on a scale generous enough to enable them to expand their facilities to the extent required. One source states that in relation to income, grants by Canadian corporations to education are very much smaller than in the United States.

It is evident that secondary industry and the Canadian business community generally can contribute to a solution of the problem of skilled labour shortages. As secondary industry will be increasingly dependent upon a higher proportion of skilled labour, its rate of growth cannot be considered apart from the supply of managers, engineers and skilled technicians. For the purpose of our forecasts, however, we have assumed that industry, educators and governments will take the steps necessary to avoid a shortage of trained manpower serious enough to impede the anticipated growth of secondary industry.

¹³A more detailed analysis of demand and supply considerations is given in the report prepared for the Commission on *Skilled and Professional Manpower in Canada 1945-1965*.

¹⁴*Hearings*, Toronto, February 15, p. 5737.

Table J

FORECAST OF OUTPUT OF SECONDARY INDUSTRY IN 1980

Industry grouping ^a	Gross value of production (1953 \$ million)			Value-added ^e (1953 \$ million)		Gross Domestic Product ^e (1949 \$ million)	
	1953	Growth Factor ^d	Forecast 1980 ^f	1953	1980 ^f	1953	1980 ^f
1. Bakery products....	\$ 354	\$ 200	\$ 700	\$ 180	\$ 350	\$ 90	\$ 175
2. Beverages.....	443	275	1,200	299	825	183	500
3. Miscellaneous foods (secondary).....	509	250	1,275	162	400	90	225
4. Tobacco and tobacco products.....	214	250	525	75	200	44	100
5. Rubber products....	291	375	1,100	173	650	81	300
6. Leather products....	222	250	550	104	250	90	225
7. Textiles.....	701	200	1,400	299	600	241	475
8. Clothing, incl. knitting mills.....	858	225	1,925	415	950	299	675
9. Furniture.....	232	225	525	122	275	84	200
10. Other wood products (secondary).....	117	225	250	50	125	68	150
11. Paper products (secondary).....	389	300	1,175	167	500	87	275
12. Printing, publishing, etc.....	544	300	1,625	364	1,100	209	625
13. Agricultural implements.....	171	225	400	79	175	46	100
14. Industrial machinery (incl. household etc.).	385	425	1,650	239	1,025	106	450
15. Primary iron and steel.....	459	400	1,825	217	875	151	600
16. Other iron and steel products.....	1,083	350	3,800	606	2,125	356	1,250
17. Motor vehicles and parts.....	1,143	275	3,150	415	1,150	800	1,875
18. Railway rolling stock	338	175	600	154	275		
19. Shipbuilding.....	183	150	275	116	175		
20. Aircraft and parts...	399	200	800	261	525		
21. Other transportation equipment.....	26	300	75	16	50		
22. Non-ferrous metals (secondary).....	371	375	1,400	148	550	91	350
23. Non-metallic minerals (secondary).....	300	250	750	174	425	132	325
24. Electrical apparatus and supplies.....	848	550	4,675	458	2,525	317	1,750
25. Petroleum and coal products ^b	823 ^b	400 ^b	4,650 ^b	212	1,200	115	650
26. Chemicals (secondary)	625	500	3,125	315	1,575	193	975
27. Miscellaneous second- ary manufacturing..	261	500	1,300	155	775	107	525
28. G.D.P. adjustment for rents etc. ^c	—	—	—	—	—	35	125
29. Total, secondary manufacturing industries.....	\$12,288	331	\$40,725	\$5,975	\$19,325	\$4,015	\$12,900
30. Total, all manufacturing (primary and secondary).....	\$17,785	324 ^g	\$57,700 ^g	\$7,993	\$25,900 ^g	\$5,212	\$16,600 ^g

See following page for notes.

PROSPECTS FOR INDIVIDUAL INDUSTRIES AND SPECIAL ASPECTS OF GROWTH

NOTES TO TABLE J

- a This division follows the D.B.S. classification used in the *General Review of the Manufacturing Industries of Canada*, but excludes those industries which for purposes of this study are classed as "Primary Manufacturing".
- b The growth factor of 400 was applied to the 1955 Gross Value of Production of petroleum and coal products, as D.B.S. reports a significant underestimation in the reporting of G.V.P. prior to 1954. If 1953 had been used as the base the growth factor would have been 560.
- c Explained in Commission Study *Output, Labour and Capital in the Canadian Economy*.
- d Growth factor is a forecast of the size of the industry's output in 1980 relative to output in 1953. It is arrived at by consideration of the forecasts provided in industry studies and briefs and the other Commission studies and forecasts.
- e Value-added and G.D.P. in 1980 were assumed to bear the same relationship to G.V.P. as now.
- f All projections are rounded to nearest \$25 million.
- g Our estimate for primary manufacturing.

FORECAST OF 1980 — EMPLOYMENT IN SECONDARY MANUFACTURING INDUSTRY

Table K

Industry groupings	Historical record of employment ^a (thousands)			1980 Projection			Increase in employment		Value-added per employee (\$ 1953)	
	1926	1939	1953	Growth factor ^b	Productivity increase ^c %	Estimated employment 1980 (000's) ^d	%	1953	1980	
1. Bakery products.....	13.4	23.1	40.3	200	2½	50	24	\$ 4,500	\$ 7,000	
2. Beverages.....	6.9	12.7	21.9	275	4½	22	—	13,650	37,500	
3. Miscellaneous foods (secondary)...	18.8	20.6	23.1	250	3	32	39	7,000	12,500	
4. Tobacco and tobacco products.....	8.5	10.8	9.5	250	4	10	5	7,900	20,000	
5. Rubber products.....	13.6	14.2	22.6	375	4	36	33	7,650	18,050	
6. Leather products.....	22.3	26.9	33.1	250	2	59	78	3,150	4,250	
7. Textiles.....	35.9	47.8	73.2	200	3	80	9	4,075	7,500	
8. Clothing, incl. knitting mills.....	59.2	78.0	120.1	225	2	192	60	3,450	5,000	
9. Furniture.....	11.2	13.2	29.8	225	2	48	61	4,100	5,725	
10. Other wood products (secondary)...	7.3	11.2	12.9	225	2	21	63	3,875	5,950	
11. Paper products (secondary).....	7.3	11.7	26.2	300	3	43	64	6,375	11,625	
12. Printing, publishing, etc.....	29.4	37.6	66.5	300	3	109	64	5,475	10,100	
13. Agricultural implements.....	10.1	5.3	14.2	225	3	18	27	5,575	9,725	
14. Industrial machinery (incl. household).....	9.5	12.5	40.6	425	2	123	203	5,875	8,325	
15. Primary iron and steel.....	6.1	13.8	35.0	400	3½	67	91	6,200	13,050	
16. Other iron and steel products.....	43.6	42.0	98.5	350	3	189	92	6,150	11,250	
17. Motor vehicles and parts.....	14.7	22.5	56.3	275	3	85	51	7,375	13,525	
18. Railway rolling stock.....	22.3	17.6	35.5	175	2½	39	9	4,350	7,050	
19. Shipbuilding.....	4.8	3.5	22.6	150	1½	28	24	5,125	6,250	
20. Aircraft and parts.....	—	3.6	38.1	200	2½	48	26	6,850	10,950	
21. Other transportation equipment.....	3.3	1.4	3.7	300	2	8	116	4,325	6,250	
22. Non-ferrous metals (secondary)...	8.6	11.9	26.9	375	3	55	105	5,500	10,000	
23. Non-metallic minerals (secondary)...	14.0	12.1	29.2	250	2½	45	54	9,450	9,450	
24. Electrical apparatus and supplies...	15.2	20.3	76.9	550	3½	203	164	5,950	12,450	
25. Petroleum and coal products.....	8.1	8.9	17.1	400 ^h	5	24	40	12,400	50,000	
26. Chemicals (secondary).....	12.0	18.5	36.6	500	4	77	110	8,600	20,150	
27. Miscellaneous secondary manufacturing.....	8.7	9.2	32.2	500	2½	100	211	4,825	7,750	

Table K (continued)

Industry groupings	Historical record of employment ^a (thousands)			1980 Projection			Increase in employment	Value-added per employee ^e (\$1953)	
	1926	1939	1953	Growth factor ^b	Productivity increase ^c	Estimated employment 1980 (000's) ^d		1953	1980
Total employment secondary manufacturing (census basis) ^{a..}	414.8	510.6	1,042.3	331	3.2	1,811	74	\$ 5,725	\$10,750
Total employment secondary manufacturing (labour force basis) ^a	494.0	565.0	1,090.0	—	—	1,907 ^f			
Civilian persons with jobs (total economy) ^a	3,381	3,981	5,246	—	—	9,637 ^g			
Secondary industry employment (census) as percentage of total employment ^a	12.3	12.8	19.9	—	—	18.8			
Secondary industry employment (labour force) as percentage of total employment ^a	14.6	14.2	20.8	—	—	19.8			
Census employment as percentage of labour force employment.....	84.0	90.4	95.6	—	—	95.0 ^f			

^a Individual industry figures for employment are based on the Census of Industry series. A discussion of the differences between the aggregate of these figures and the employment totals for secondary industry obtained from Labour Force data will be found in the Commission Study Output, Labour and Capital in the Canadian Economy; a brief explanation is also given in the present study.

^b See Table J. The Growth factor is forecast output in 1980 relative to output in 1953.

^c Estimated annual percentage increase in output per man-hour, 1953 to 1980.

^d The 1980 employment estimate is the product of four factors enumerated in the text:

- (1) 1953 employment.
- (2) growth factor.

(3) the reciprocal of the amount of the annual productivity increase compounded for 27 years.

(4) the reciprocal of the expected 17.7% reduction by 1980 in hours worked per week (41.7 down to 34.3, the Commission estimate for the private economy), e.g. for bakery products, the calculation is $40,300 \times 200 \times .513 \times 1.216 = 50,000$ (rounded).

^e Rounded to nearest \$25.

^f Assuming 1980 census estimate is 95% of the Labour Force total.

^g This figure is 97% of estimated civilian labour force in 1980, on basis of net annual immigration of 75,000.

^h The growth factor was applied to 1955 estimated employment of 18,100, to be consistent with output calculations in Table J.

Table I.

CAPITAL INVESTMENT IN SECONDARY MANUFACTURING INDUSTRY^a 1948, 1953-55, AND FORECAST 1980

	1948 ^b	1953 ^b	1954 ^b	1955 ^b	Growth factor ^c	1980 Forecast 1953-55 average x growth factor
Bakery products.....	\$ 14.6	\$ 15.2	\$ 14.9	\$ 15.0	200	\$30
Beverages.....	28.8	24.0	30.2	30.5	275	78
Tobacco and tobacco products.....	3.2	3.2	2.7	4.4	250	9
Rubber products.....	7.2	15.2	17.0	15.1	375	59
Leather products.....	3.6	3.1	2.5	2.3	250	7
Textiles.....	35.3	27.8	27.3	28.0	200	55
Clothing.....	12.4	13.6	7.5	9.2	225	23
Furniture.....	3.5	6.0	4.2	7.0	225	13
Printing, publishing, etc.....	19.4	16.6	29.3	24.1	300	70
Agricultural implements.....	6.2	4.2	3.0	2.4	225	7
Industrial machinery.....	10.5	19.4	21.0	10.0	425	71
Primary iron and steel.....	19.3	49.9	32.3	34.5	400	156
Motor vehicles and parts.....	10.0	72.0	50.8	36.4	275	146
Railway rolling stock.....	4.7	9.4	6.7	4.0	175	12
Shipbuilding.....	0.9	3.5	2.6	2.7	150	4
Aircraft and parts.....	0.9 ^d	12.5 ^d	8.0 ^d	10.6 ^d	200	21
Non-ferrous metals (secondary).....	6.3	12.0	6.4	8.9	375	34
Electrical apparatus and supplies.....	16.7	36.0	28.8	32.5	550	178
Petroleum and coal products...	43.9	83.2	92.5	109.1	400	380
Chemicals (secondary).....	29.4	23.1	25.7	27.9	500	128
Total selected secondary.....	276.9	449.9	413.4	414.6	348	1,481
Residue — miscellaneous.....	68.3	98.5	89.9	114.4	400 ^k	404
Sub-total secondary manufacturing.....	345.2 ^e	548.4 ^e	503.3 ^e	529.0 ^e	360	1,885
Capital items charged to operating expenses ^f	34.5	54.8	50.3	55.9	—	189
Grand total, sec. mfg.....	\$379.7	\$603.2	\$553.6	\$584.9	360	\$2,074
Total, primary mfg.g.....	196.3	360.1	268.5	361.6		
Total manufacturing ^h	576.0	963.3	822.1	946.5		
Secondary mfg. as % of total mfg.....	65.9	62.6	67.3	61.8		

a Investment is defined as new investment in construction and machinery.

b Information supplied by Trade and Commerce, Economics Branch. Data different from material in the Outlook Series for various reasons such as omissions and double counting.

c Forecast output in 1980 relative to output in 1953. See Table J.

d Bicycles, boats and canoes, carriages and wagons are included but magnitudes are very minor.

e In 1948-54 inclusive it was necessary to put Fine paper mills in with Pulp mills (primary); and in the Wood products group, Sash and door mills were included in with Planing mills, also Primary manufacturing.

f The "Capital items charged to operating expenses" is an arbitrary 10% of the total in the Outlook Series for all groups in Manufacturing. A different method was used in 1955 but we have simply increased the forecast Secondary Manufacturing total by 10%.

g Primary manufacturing is obtained by subtracting Secondary manufacturing from the total.

h Includes the 10% allowance for Capital items, see (f) above.

k This group covers a larger group of industries than the Miscellaneous in Table J; the 500 growth factor in the table has been reduced to 400 to allow for the lower growth rates projected in the additional industries.

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Table 1

CANADIAN POPULATION GROWTH 1867-1956 (*thousands*)

Period	Population at end of period	Growth of population	Per cent increase	Immigration	Emigration	Net immigration
1867.....	3,499					
1868-71.....	3,689	190	5.3	84	87	— 3
1872-81.....	4,325	636	17.2	363	385	— 22
1882-91.....	4,833	508	11.7	920	1,007	— 87
1892-1901.....	5,371	538	11.1	313	382	— 69
1902-11.....	7,207	1,836	34.2	1,920	1,166	754
1912-21.....	8,788	1,581	21.9	1,473	1,306	167
1922-31.....	10,377	1,589	18.1	1,166	929	237
1932-41.....	11,507	1,130	10.9	140	224	— 84
1942-51.....	14,009	2,502	21.7	676	462	214
1952-56.....	16,081	2,072	14.8	762	199	563

SOURCE: Population and immigration data from Canada Year Book.

Emigration figures estimated by Dr. O. J. Firestone prior to 1921, derived by residual methods thereafter.

Table 2

REAL GROSS NATIONAL PRODUCT, TOTAL AND PER CAPITA FOR SELECTED YEARS (1935-39 dollars)

	Total (\$ million)	Per capita \$
1870.....	711	194
1900.....	1,868	349
1920.....	3,512	404
1929.....	5,337	527
1933.....	3,772	353
1939.....	5,664	500
1945.....	9,315	764
1949.....	9,722	723
1955.....	12,866	825

NOTE: Unadjusted estimates for 1870 to 1920 are from Dr. O. J. Firestone, *Canada's Economic Development, 1867-1952*. Official estimates for 1929 to 1955.

Table 3

SUMMARY OF MANUFACTURING STATISTICS, 1870-1953

Years	Establishments (thousands)	Capital (\$ million)	Employees (thousands)	Net value of products		Gross value of products	
				Current \$	Constant \$ ^a (\$ million)	Current \$	Constant \$ ^a (\$ million)
1870.....	41.3	78.0	187.9	96.7	240.5	221.6	551.2
1880.....	49.7	165.3	254.9	129.8	358.6	309.7	855.5
1890 ^b	76.0	353.2	369.6	219.1	648.2	469.9	1,390.2
1900.....	14.7	446.9	339.2	214.5	681.0	481.1	1,527.3
1910.....	19.2	1,247.6	515.2	564.5	1,425.5	1,166.0	2,944.4
1917.....	21.8	2,334.0	606.5	1,281.1	1,690.1	2,820.8	3,721.4
1920.....	22.5	2,923.7	598.9	1,621.3	1,551.5	3,706.5	3,546.8
1921.....	20.8	2,697.9	438.6	1,123.7	1,449.9	2,489.0	3,211.6
1926 ^c	21.3	3,208.1	558.2	1,302.8	1,950.3	3,108.7	4,653.7
1929 ^c	22.2	4,004.9	665.3	1,753.4	2,723.0	3,879.4	6,024.7
1933.....	23.8	3,279.3	468.4	918.9	1,963.7	1,952.9	4,173.3
1939.....	24.8	3,647.0	658.1	1,530.2	2,988.5	3,472.8	6,782.4
1946.....	31.2	not collected	1,058.2	3,467.0	5,002.9	8,033.1	11,591.8
1949 ^c	35.8	"	1,171.2	5,330.6	5,330.6	12,479.6	12,479.6
1953 ^c	38.1	"	1,327.5	7,993.1	6,956.6	17,785.4	15,479.0

^a 1949 dollars: General Wholesale Price Index 1935-39=100 mechanically converted to 1949 base, was used for deflation prior to 1913. In following years the same procedure was used with the "Fully and chiefly manufactured" component of this index.

^b Data for 1890 not wholly comparable to 1917 onward.

^c See Census of Industry, various issues, for technical footnotes.

Table 4
GROSS AND NET VALUE OF PRODUCTION IN SELECTED CANADIAN MANUFACTURING INDUSTRIES,
1901, 1911, 1921
(millions of current dollars)

	1901 ^a		1911 ^a		1921 ^b	
	Gross Value of Production	Net Value of Production	Gross Value of Production	Net Value of Production	Gross Value of Production	Net Value of Production
Beverages.....	9.2	6.0	28.9	21.1	39.1	26.9
Tobacco products.....	11.8	8.1	25.3	13.2	67.0	43.5
Rubber products.....	1.2	0.4	5.8	2.8	39.5	22.6
Leather products.....	34.7	13.0	62.9	28.5	81.0	34.5
Textile products.....	32.2	14.9	49.6	20.9	189.0	88.4
Clothing.....	37.5	18.9	91.3	45.1	141.5	59.8
Furniture.....	6.9	4.2	12.4	8.0	23.9	15.4
Printing and publishing.....	13.2	9.5	25.4	17.8	96.7	67.7
Agricultural implements.....	9.6	5.5	20.7	10.2	36.8	18.8
Railway rolling stock.....	4.0	1.7	16.6	7.9	40.2	17.3
Shipbuilding.....	1.9	1.2	5.1	3.4	19.5	13.5
Non-ferrous smelting.....	7.1	5.4	33.7	15.8	not available	
Electrical apparatus.....	3.0	1.9	15.0	8.7	44.5	25.3
Medicinal and pharmaceutical preparations.....	2.7	1.6	6.8	4.2	7.5	11.9
Pulp and paper mills.....	4.4	2.2	14.1	7.6	150.9	88.7
Sawmills.....	61.6	30.0	145.4	69.0	152.1	76.4
Total of above industries.....	241.0	124.5	559.0	284.2	1,129.2	610.7
Other manufacturing industries.....	240.1	90.1	607.0	280.3	1,427.3	576.0
Grand total.....	481.1	214.6	1,166.0	564.5	2,556.5	1,186.7

^a Data are from Census of Canada 1901-11.

^b Data are from Canada Year Book 1922-23, 1921 data not fully comparable to 1901-11.

Table 5

**GROSS VALUE OF PRODUCTION, SELECTED SECONDARY MANUFACTURING INDUSTRIES,
1926, 1929, 1933, 1939, CURRENT AND CONSTANT DOLLARS**
(millions of current and constant dollars)

	1926		1929		1933		1939	
	Current dollars	Constant (1949) dollars	Current dollars	Constant (1949) dollars	Current dollars	Constant (1949) dollars	Current dollars	Constant (1949) dollars
Beverages.....	65.7	98.4	123.8	199.4	54.5	116.5	95.2	186.3
Bakery products ^a	62.9	82.7	77.2	100.8	51.2	82.3	76.0	115.5
Tobacco products.....	65.2	97.6	85.2	137.2	43.9	93.8	69.6	136.2
Rubber products ^a	86.5	65.7	96.9	111.8	41.5	59.0	85.7	85.7
Leather products ^a	84.9	130.8	87.6	126.4	57.5	99.0	81.5	137.7
Textile products ^a	157.1	249.0	173.4	301.0	133.2	302.7	183.7	413.7
Clothing ^a	213.2	337.9	250.6	435.1	159.4	362.3	229.7	517.3
Furniture.....	39.4	59.0	55.0	88.6	19.9	42.5	36.8	72.0
Printing, publishing, etc.....	105.8	158.4	140.5	226.2	92.6	197.9	119.5	233.9
Agricultural implements ^a	38.3	64.2	40.7	72.7	5.3	10.4	16.0	26.8
Industrial machinery ^a	38.4	64.3	65.7	117.3	19.2	37.6	49.1	82.2
Primary iron and steel ^a	41.2	69.1	72.2	128.9	18.5	36.3	75.9	127.1
Motor vehicles and parts.....	145.7	218.1	209.3	337.0	55.9	119.4	146.2	286.1
Railway rolling stock.....	72.7	108.8	126.5	203.7	29.7	63.5	60.7	118.8
Shipbuilding.....	13.0	19.5	17.5	28.2	4.5	9.6	11.2	21.9
Aircraft and parts.....	—	—	1.0	1.6	0.3	0.6	12.6	24.7
Secondary non-ferrous metals.....	40.9	43.6	59.9	64.5	27.2	45.1	64.4	93.6
Electrical apparatus and supplies.....	69.8	104.5	113.8	183.3	37.0	79.1	89.1	174.4
Petroleum and coal products ^a	104.7	121.5	139.3	187.7	100.2	155.3	143.6	237.7
Secondary chemicals ^a	97.4	120.0	113.0	146.0	77.9	118.0	127.5	197.3
Selected secondary manufacturing total.....	1,542.8	2,213.1	2,049.1	3,197.4	1,029.4	2,030.9	1,758.2	3,288.9
Residue.....	495.2	837.8	627.5	1,112.7	295.9	800.9	522.6	1,174.5
Total secondary manufacturing....	2,038.0	3,050.9	2,676.6	4,310.1	1,325.3	2,831.8	2,280.8	4,463.4

SOURCE: Data from various issues of the D.B.S. Census of Industry. Constant dollars data obtained by use of the wholesale price index. This deflator is mechanically converted from 1935-39 base to arrive at 1949 dollars.

^a Fully and chiefly manufactured component of wholesale price index used as deflator.

Table 6

SUMMARY OF PRINCIPAL STATISTICS, PRIMARY AND SECONDARY MANUFACTURING, 1926-53

	1926	1929	1933	1939	1941	1944	1946	1949	1950	1951	1952	1953
Establishments: (000's)												
Primary.....	9	9	10	10	10	11	12	14	14	15	15	15
Secondary.....	12	13	14	15	16	17	19	22	22	22	23	23
Total.....	21	22	24	25	26	28	31	36	36	37	38	38
Employees: (000's)												
Primary.....	143	166	99	147	188	219	232	254	258	278	282	285
Secondary.....	415	499	369	511	772	1,002	826	917	925	980	1,006	1,042
Total.....	558	665	468	658	960	1,221	1,058	1,171	1,183	1,258	1,288	1,327
Salaries and wages: (million \$)												
Primary.....	151	171	91	165	239	336	384	571	614	746	803	851
Secondary.....	473	605	345	572	1,025	1,691	1,357	2,021	2,157	2,530	2,835	3,106
Total.....	624	776	436	737	1,264	2,027	1,741	2,592	2,771	3,276	3,638	3,957
Production workers: (000's)												
Primary.....	126	148	81	120	156	182	191	206	209	226	227	229
Secondary.....	357	429	301	413	646	847	686	744	743	785	798	824
Total.....	483	577	382	533	802	1,029	877	950	952	1,011	1,025	1,053
Wages: (million \$)												
Primary.....	121	138	66	123	187	267	291	448	481	587	627	662
Secondary.....	361	463	231	397	791	1,343	1,038	1,515	1,598	1,873	2,087	2,278
Total.....	482	601	297	520	978	1,610	1,329	1,963	2,079	2,460	2,714	2,940
Gross Value of Production: (million \$)												
Primary.....	1,071	1,202	628	1,192	1,846	2,597	2,773	4,128	4,534	5,537	5,380	5,495
Secondary.....	2,038	2,677	1,325	2,281	4,226	6,470	5,260	8,352	9,283	10,855	11,603	12,290
Total.....	3,109	3,879	1,953	3,473	6,072	9,067	8,033	12,480	13,817	16,392	16,983	17,785
Value-added: (million \$)												
Primary.....	345	438	243	409	627	764	871	1,368	1,581	1,955	1,897	2,017
Secondary.....	958	1,315	676	1,121	1,975	3,246	2,596	3,963	4,361	4,986	5,547	5,976
Total.....	1,303	1,753	919	1,530	2,602	4,010	3,467	5,331	5,942	6,941	7,444	7,993

SOURCE: Census of Industry Manufacturing Statistics. Division between primary and secondary manufacturing according to Appendix B.

Table 7

COMPARISON OF CENSUS OF INDUSTRY AND LABOUR FORCE EMPLOYMENT DATA,
SELECTED YEARS

	1926	1929	1933	1939	1941	1944	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Total manufacturing employment (000's)																
A. Census of industry	558	665	468	658	960	1,221	1,058	1,131	1,156	1,171	1,183	1,258	1,288	1,327	1,268	1,288
B. Labour force	669	787	560	728	984	1,325	1,222	1,269	1,273	1,311	1,323	1,355	1,339	1,388	1,312	1,362
Percentage A is of B	83.4	84.5	83.6	90.4	97.6	92.2	86.6	89.1	90.8	89.3	89.4	92.8	96.2	95.6	96.6	94.6
Secondary manufacturing employment (000's)																
A. Census of industry	415	499	369	511	772	1,002	826	881	897	917	925	980	1,006	1,042	978	N.A.
B. Labour force	498	591	441	565	792	1,086	955	989	989	1,027	1,037	1,054	1,046	1,090	1,012	1,049
Percentage A is of B	83.3	84.4	83.7	90.4	97.5	92.3	86.5	89.1	90.7	89.3	89.2	93.0	96.2	95.6	96.6	—
Primary manufacturing employment (000's)																
A. Census of industry	143	166	99	147	188	219	232	250	259	254	258	278	282	285	290	N.A.
B. Labour force	171	196	119	163	192	239	267	280	284	284	286	301	293	298	300	313
Percentage A is of B	83.6	84.7	83.2	90.2	98.4	91.6	86.9	89.3	91.2	89.4	90.2	92.4	96.2	95.6	96.7	—

NOTE: For Labour Force data see *Output, Labour and Capital in the Canadian Economy*.

Table 8

EMPLOYMENT AND PERCENTAGE DISTRIBUTION OF THE LABOUR FORCE BY SECTORS, SELECTED YEARS

	1926	1929	1933	1939	1941	1944	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Civilian persons with jobs.....(000's) %	3,381 100.0	3,822 100.0	3,385 100.0	3,981 100.0	4,157 100.0	4,435 100.0	4,687 100.0	4,844 100.0	4,886 100.0	4,947 100.0	4,996 100.0	5,111 100.0	5,173 100.0	5,246 100.0	5,194 100.0	5,328 100.0
Agriculture.....(000's) %	1,181 34.9	1,224 32.0	1,178 34.8	1,293 32.5	1,147 27.6	1,067 24.0	1,186 25.3	1,122 23.2	1,096 22.4	1,079 21.8	1,018 20.4	940 18.4	887 17.1	858 16.4	873 16.8	817 15.3
Resource industries.....(000's) %	178 5.3	208 5.4	150 4.4	228 5.7	255 6.1	190 4.3	216 4.6	219 4.5	228 4.7	221 4.5	239 4.8	271 5.3	267 5.2	254 4.8	267 5.1	297 5.6
Primary manufacturing.....(000's) %	171 5.1	196 5.1	119 3.5	163 4.1	192 4.6	239 5.4	267 5.7	280 5.8	284 5.8	284 5.7	286 5.7	301 5.9	293 5.7	298 5.7	300 5.8	313 5.9
Secondary manufacturing.....(000's) %	498 14.7	591 15.5	441 13.0	565 14.2	792 19.1	1,086 24.5	955 20.4	989 20.4	989 20.3	1,027 20.8	1,037 20.8	1,054 20.6	1,046 20.2	1,090 20.8	1,012 19.5	1,049 19.7
Construction.....(000's) %	139 4.1	198 5.2	151 4.5	186 4.7	211 5.1	160 3.6	228 4.9	254 5.2	289 5.9	321 6.5	337 6.7	351 6.9	344 6.6	352 6.7	333 6.4	367 6.9
Trade (wholesale and retail).....(000's) %	318 9.4	405 10.6	394 11.7	506 12.7	492 11.8	492 11.1	574 12.2	637 13.2	650 13.3	652 13.2	645 12.9	718 14.0	785 15.2	815 15.5	818 15.8	836 15.7
Service and others.....(000's) %	896 26.5	1,000 26.2	952 28.1	1,040 26.1	1,068 25.7	1,201 27.1	1,261 26.9	1,343 27.7	1,350 27.6	1,363 27.5	1,434 28.7	1,476 28.9	1,551 30.0	1,579 30.1	1,591 30.6	1,649 30.9

Table 9

CENSUS OF INDUSTRY EMPLOYMENT IN SECONDARY MANUFACTURING BY SELECTED MAJOR INDUSTRIES, 1926-54

(thousands)

	1926	1929	1933	1939	1941	1944	1946	1947	1948	1949	1950	1951	1952	1953	1954
Total secondary manufacturing..	414.8	499.4	369.0	510.6	771.7	1,001.8	826.0	881.2	896.4	917.3	924.7	979.5	1,006.4	1,042.3	978.5
Beverages.....	6.9	9.6	8.3	12.7	15.1	16.8	18.6	20.0	20.0	21.1	20.7	21.0	21.1	21.8	21.9
Bakery products.....	13.4	17.0	17.5	23.1	25.0	27.5	30.5	36.4	37.2	38.5	37.5	38.4	39.2	40.3	40.5
Miscellaneous foods and beverages...	18.8	20.1	16.6	20.6	24.1	25.9	25.0	21.8	22.2	23.8	22.2	22.2	22.9	23.0	22.8
Tobacco products.....	8.5	9.3	10.0	10.8	11.4	11.8	10.8	10.9	10.5	10.7	10.3	9.8	9.3	9.5	9.5
Rubber products.....	13.6	17.8	9.8	14.2	17.2	21.4	22.1	23.5	21.7	20.7	21.8	23.1	21.6	22.6	20.9
Leather products.....	22.3	22.7	21.7	26.9	31.8	31.9	37.3	35.7	34.3	34.9	33.0	31.6	32.1	33.1	30.5
Textiles.....	35.9	39.3	40.0	47.8	66.5	64.0	66.9	73.6	75.8	77.8	80.3	81.7	72.7	73.2	63.8
Clothing.....	59.2	68.2	59.2	78.0	95.8	94.9	105.9	110.3	115.1	117.7	116.2	115.7	117.7	120.1	111.6
Furniture.....	11.2	15.0	9.2	13.1	16.8	16.9	22.7	24.8	25.9	26.9	27.3	27.3	27.2	29.8	29.5
Other secondary wood products....	7.3	9.2	7.7	11.2	13.7	15.8	16.4	16.9	15.9	14.0	12.8	13.3	13.5	12.9	11.8
Secondary paper products.....	7.3	9.3	8.3	11.7	16.0	18.9	22.5	23.5	24.1	24.4	25.2	25.6	25.2	26.2	26.4
Printing, publishing, etc.....	29.4	35.4	32.0	37.6	39.7	40.4	48.7	51.9	54.5	61.8	63.1	64.7	64.5	66.5	68.0
Agricultural implements.....	10.1	11.4	3.0	5.3	8.8	14.1	13.9	16.0	19.1	16.6	16.2	17.2	18.0	14.2	14.4
Industrial machinery.....	9.6	12.4	6.5	12.5	26.6	8.0	32.5	35.4	35.1	26.9	26.7	30.5	31.4	30.6	30.0
Primary iron and steel.....	6.1	11.2	5.2	13.8	23.7	30.8	24.2	26.9	29.4	29.1	29.1	33.4	35.0	34.9	28.9
Other iron and steel products.....	43.5	55.3	28.1	42.0	79.6	139.3	80.9	84.1	86.5	91.1	92.6	102.2	104.8	108.5	98.7
Motor vehicles and parts.....	14.7	21.1	11.9	22.5	38.5	42.9	37.0	41.3	41.1	44.9	49.1	51.7	52.9	56.3	46.9
Railway rolling stock.....	22.3	25.5	16.2	17.7	28.1	29.9	28.6	28.5	31.4	32.4	29.3	33.4	36.1	35.4	29.6
Shipbuilding.....	4.8	5.3	2.3	3.5	21.2	67.1	20.2	21.1	18.4	12.6	11.5	14.8	20.7	22.6	19.6
Aircraft and parts.....	—	0.2	0.1	3.6	26.7	79.6	11.4	9.4	8.0	10.7	10.5	19.2	33.3	38.0	35.1
Other transportation equipment.....	3.3	4.0	1.2	1.4	1.9	2.1	2.9	3.2	2.9	4.1	3.8	3.4	3.4	3.9	3.1
Secondary non-ferrous metal products	8.6	10.9	7.1	11.8	24.3	31.6	26.3	25.9	26.3	25.5	24.8	27.3	26.3	26.9	24.1
Electrical apparatus and supplies...	15.3	20.9	11.8	20.3	33.1	48.8	44.0	52.8	53.9	55.9	60.3	67.6	69.2	76.9	75.1
Non-metallic mineral products.....	14.0	17.0	7.5	12.1	15.8	16.0	20.4	22.1	22.9	23.9	25.2	26.6	26.6	29.2	30.1
Petroleum and coal products.....	8.0	8.9	8.2	8.8	9.7	11.6	12.1	12.8	13.7	14.6	15.2	15.6	16.9	17.1	17.5
Secondary chemicals.....	12.0	13.5	13.0	18.5	46.2	72.1	26.6	29.4	28.2	30.9	30.8	33.4	35.0	36.6	37.1
Miscellaneous manufacturing.....	8.7	8.9	6.6	9.1	14.4	21.7	17.6	23.0	22.3	26.4	27.2	28.8	29.8	32.2	31.1

Table 10

PERCENTAGE DISTRIBUTION OF EMPLOYMENT AS SHOWN IN TABLE 9

	1926	1929	1933	1939	1941	1944	1946	1947	1948	1949	1950	1951	1952	1953	1954
Total secondary manufacturing.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Beverages.....	1.7	1.9	2.2	2.4	2.0	1.6	2.3	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.2
Bakery products.....	3.2	3.4	4.7	4.5	3.2	2.7	3.7	4.1	4.2	4.2	4.1	3.9	3.9	3.9	4.1
Miscellaneous foods and beverages.....	4.5	4.0	4.5	4.0	3.1	2.6	3.0	2.5	2.5	2.5	2.6	2.3	2.3	2.2	2.3
Tobacco products.....	2.0	1.9	2.7	2.1	1.5	1.1	1.3	1.2	1.2	1.2	1.1	1.0	0.9	0.9	1.0
Rubber products.....	3.3	3.6	2.7	2.8	2.2	2.1	2.7	2.7	2.4	2.3	2.4	2.4	2.1	2.2	2.1
Leather products.....	5.4	4.5	5.9	5.3	4.1	3.2	4.5	4.1	3.8	3.8	3.6	3.2	3.2	3.2	3.1
Textiles.....	8.7	7.9	10.9	9.4	8.6	6.4	8.1	8.3	8.5	8.5	8.7	8.3	7.2	7.0	6.5
Clothing.....	14.3	13.7	16.1	15.3	12.4	9.5	12.8	12.5	12.8	12.8	12.6	11.8	11.7	11.5	11.4
Furniture.....	2.7	3.0	2.5	2.6	2.2	1.7	2.7	2.8	2.9	2.9	3.0	2.8	2.7	2.9	3.0
Other secondary wood products.....	1.8	1.8	2.1	2.2	1.8	1.6	2.0	1.9	1.8	1.5	1.4	1.4	1.3	1.2	1.2
Secondary paper products.....	1.8	1.9	2.2	2.3	2.1	1.9	2.7	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.7
Printing, publishing, etc.....	7.1	7.0	8.7	7.4	5.1	4.0	5.9	5.9	6.1	6.7	6.8	6.6	6.4	6.4	6.9
Agricultural implements.....	2.4	2.3	0.8	1.0	1.1	1.4	1.7	1.8	2.1	1.8	1.8	1.8	1.8	1.4	1.5
Industrial machinery.....	2.3	2.5	1.8	2.4	3.4	.8	3.9	4.0	3.9	2.9	2.9	3.1	3.1	2.9	3.1
Primary iron and steel.....	1.5	2.2	1.4	2.7	3.1	3.1	2.9	3.1	3.3	3.2	3.2	3.4	3.5	3.3	3.0
Other iron and steel products.....	10.5	11.1	7.6	8.2	10.3	13.9	9.8	9.5	9.6	9.9	10.0	10.4	10.4	10.4	10.1
Motor vehicles and parts.....	3.5	4.2	3.2	4.4	5.0	4.3	4.5	4.7	4.6	4.9	5.3	5.3	5.3	5.4	4.8
Railway rolling stock.....	5.4	5.1	4.4	3.5	3.6	3.0	3.5	3.2	3.5	3.5	3.2	3.4	3.6	3.4	3.0
Shipbuilding.....	1.2	1.1	0.6	0.7	2.8	6.7	2.4	2.4	2.1	1.4	1.2	1.5	2.1	2.2	2.0
Aircraft and parts.....	—	—	—	0.7	3.5	7.9	1.4	1.1	0.9	1.2	1.1	2.0	3.3	3.6	3.6
Other transportation equipment.....	—	—	—	0.3	0.3	0.2	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.3
Secondary non-ferrous metal products.....	0.8	0.8	0.3	0.3	0.3	3.1	3.2	2.9	2.9	2.8	2.7	2.8	2.6	2.6	2.5
Electrical apparatus and supplies.....	2.1	2.2	1.9	2.3	3.1	3.2	3.2	2.9	2.9	2.8	2.7	2.8	2.6	2.6	2.5
Non-metallic mineral products.....	3.7	4.2	3.3	4.0	4.3	4.9	5.3	6.0	6.0	6.1	6.5	6.9	6.9	7.4	7.7
Non-metallic mineral products.....	3.4	3.4	2.0	2.4	2.0	1.6	2.5	2.5	2.6	2.6	2.7	2.7	2.6	2.8	3.1
Petroleum and coal products.....	1.9	1.8	2.2	1.7	1.3	1.2	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.6	1.8
Secondary chemicals.....	2.8	2.7	3.5	3.6	6.0	7.2	3.2	3.3	3.1	3.4	3.3	3.4	3.5	3.5	3.8
Miscellaneous manufacturing.....	2.0	1.8	1.8	1.8	1.9	2.2	2.1	2.6	2.5	2.9	2.9	2.9	3.0	3.1	3.2

SOURCE: Table 9.

Table 11

NATIONAL INCOME ORIGINATING BY SECTORS, SELECTED YEARS

(millions of current dollars)

	1926	1929	1933	1939	1941	1944	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Agriculture.....	788	581	187	512	631	1,337	1,276	1,404	1,705	1,693	1,709	2,296	2,095	1,886	1,368	1,627
Resource industries.....	234	295	154	382	483	469	600	641	772	724	905	1,160	1,090	1,038	1,070	1,254
Manufacturing.....	914	1,175	559	1,164	1,983	2,892	2,782	3,376	3,834	3,942	4,471	5,158	5,396	5,692	5,426	5,957
Construction.....	201	290	69	148	254	283	430	572	684	776	809	856	1,025	1,234	1,235	1,444
Trade.....	507	630	354	590	853	1,076	1,411	1,654	1,860	1,985	2,163	2,394	2,578	2,628	2,630	2,848
Services and others.....	1,541	1,818	1,129	1,577	2,359	3,769	3,322	3,338	3,705	4,074	4,493	5,274	6,142	6,655	7,079	7,608
Total.....	4,185	4,789	2,452	4,373	6,563	9,826	9,821	10,985	12,560	13,194	14,550	17,138	18,326	19,133	18,808	20,738

SOURCE: *National Accounts, Income and Expenditure*, various issues.

Table 12

PERCENTAGE DISTRIBUTION OF NATIONAL INCOME BY SECTOR AS SHOWN IN TABLE 11

	1926	1929	1933	1939	1941	1944	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Agriculture.....	18.8	12.1	7.6	11.7	9.6	13.6	13.0	12.8	13.6	12.8	11.7	13.4	11.4	9.9	7.3	7.9
Resource industries.....	5.6	6.2	6.3	8.7	7.4	4.8	6.1	5.8	6.1	5.5	6.2	6.8	5.9	5.4	5.7	6.0
Manufacturing.....	21.9	24.4	22.8	26.6	30.2	29.4	28.3	30.7	30.5	29.9	30.7	30.1	29.5	29.8	28.8	28.7
Construction.....	4.8	6.1	2.8	3.4	3.9	2.9	4.4	5.2	5.5	5.5	5.6	5.0	5.6	6.4	6.6	7.0
Trade.....	12.1	13.2	14.4	13.5	13.0	10.9	14.4	15.1	14.8	15.0	14.9	13.9	14.1	13.7	14.0	13.7
Services and others.....	36.8	38.0	46.1	36.1	35.9	38.4	33.8	30.4	29.5	30.9	30.9	30.8	33.5	34.8	37.6	36.7
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Table 11.

Table 13

TARIFF CHANGES, 1928, 1933, 1936

	Year	Equivalent ad valorem tariff rates ^a (unweighted averages)		
		Preferential	Treaty	General
All manufactures	1928	12	17	21
	1933	14	25	30
	1936	10	24	30
All textiles	1928	17	23	28
	1933	21	39	45
	1936	20	41	49
All iron and steel products	1928	11	17	19
	1933	10	23	25
	1936	6	21	25
Electrical apparatus and supplies	1928	15	23	27
	1933	16	30	34
	1936	12	29	33
Glass and its products	1928	13	19	22
	1933	12	23	26
	1936	7	20	25
Petroleum products	1928	9	12	14
	1933	10	15	21
	1936	7	16	18
Leather boots and shoes	1928	16	27	29
	1933	24	37	43
	1936	20	37	43
Furniture	1928	18	28	30
	1933	22	32	49
	1936	18	31	49

^a These are unweighted arithmetical averages of ad valorem rates and ad valorem equivalents of specific rates on each tariff item of manufactured goods imported calculated from duties collected and customs valuations. Since the necessary information was not available, dumping duties were not included and no adjustments were made for arbitrary over-valuations. The averages therefore, tend to understate the tariff increases between 1928 and 1933. See W. A. Mackintosh, *The Economic Background of Dominion-Provincial Relations*, pp. 90-94.

SOURCE: Report of the Royal Commission on Dominion-Provincial Relations—Book 1, Table 53, p. 157.

Table 14

GROSS DOMESTIC PRODUCT, BY SECTORS, SELECTED YEARS
(*millions of 1949 dollars*)

	Total G.D.P. ^a	Total manufac- turing	Primary manufac- turing	Secondary manufac- turing	Agriculture	Resource industries	Retail and wholesale trade	Construc- tion	Services and others
1926.....	8,073.7	1,617.0	408.8	1,208.2	2,031.6	496.6	997.4	373.3	2,557.8
1929.....	8,958.8	1,997.3	472.3	1,525.0	1,612.5	581.8	1,236.1	539.1	2,992.0
1933.....	6,677.9	1,321.8	347.7	974.1	1,413.6	466.5	915.9	228.9	2,331.2
1939.....	9,516.9	2,122.3	566.0	1,556.3	2,183.4	803.2	1,178.7	379.1	2,850.2
1941.....	12,380.9	3,511.2	788.1	2,723.1	1,903.4	936.0	1,345.0	535.0	4,150.3
1944.....	15,717.1	4,928.8	891.9	4,036.9	2,355.5	867.7	1,454.4	434.0	5,676.7
1946.....	13,496.8	3,709.6	895.4	2,814.2	1,969.6	922.6	1,957.5	580.1	4,357.4
1947.....	13,935.4	4,016.5	977.5	3,039.0	1,827.7	981.7	2,109.5	672.0	4,328.0
1948.....	14,431.3	4,148.0	1,008.3	3,139.7	1,958.2	1,073.6	2,043.8	767.2	4,440.5
1949.....	14,779.9	4,199.1	1,014.2	3,184.9	1,892.0	1,073.3	2,104.8	820.5	4,690.2
1950.....	15,719.4	4,423.9	1,072.8	3,351.1	2,085.0	1,199.8	2,258.5	857.4	4,894.8
1951.....	16,730.6	4,743.0	1,151.1	3,591.9	2,338.5	1,391.3	2,180.6	887.8	5,189.4
1952.....	17,636.2	4,837.6	1,153.6	3,684.0	2,544.7	1,423.9	2,355.3	970.7	5,504.0
1953.....	18,341.3	5,211.6	1,196.6	4,015.0	2,406.6	1,484.1	2,530.0	1,044.5	5,664.5
1954.....	17,805.7	4,924.3	1,237.1	3,687.2	1,916.6	1,610.9	2,527.9	1,060.1	5,765.9
1955.....	19,390.3	5,274.6	1,324.7	3,949.9	2,342.3	1,819.4	2,727.8	1,187.3	6,038.9

^a Total Gross Domestic Product is for the whole economy, including Government, Armed Forces and residential rents.
SOURCE: *Output, Labour and Capital in the Canadian Economy*.

Table 15

PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC PRODUCT BY SECTORS

	Total G.D.P.	Total manufac- turing	Primary manufac- turing	Secondary manufac- turing	Agriculture	Resource industries	Retail and wholesale trade	Construc- tion	Services and others
1926.....	100.0	20.0	5.1	14.9	25.1	6.2	12.4	4.6	31.7
1929.....	100.0	22.3	5.3	17.0	18.0	6.5	13.8	6.0	33.4
1933.....	100.0	19.8	5.2	14.6	21.2	7.0	13.7	3.4	34.9
1939.....	100.0	22.3	5.9	16.4	22.9	8.4	12.4	4.0	30.0
1941.....	100.0	28.4	6.4	22.0	15.3	7.6	10.9	4.3	33.5
1944.....	100.0	31.4	5.7	25.7	15.0	5.5	9.3	2.7	36.1
1946.....	100.0	27.5	6.6	20.9	14.6	6.8	14.5	4.3	32.3
1947.....	100.0	28.8	7.0	21.8	13.1	7.1	15.1	4.8	31.1
1948.....	100.0	28.7	7.0	21.7	13.6	7.4	14.2	5.3	30.8
1949.....	100.0	28.4	6.9	21.5	12.8	7.3	14.2	5.6	31.7
1950.....	100.0	28.1	6.8	21.3	13.3	7.6	14.4	5.5	31.1
1951.....	100.0	28.3	6.9	21.4	14.0	8.3	13.0	5.3	31.1
1952.....	100.0	27.4	6.5	20.9	14.4	8.1	13.4	5.5	31.2
1953.....	100.0	28.4	6.5	21.9	13.1	8.1	13.8	5.7	30.9
1954.....	100.0	27.7	7.0	20.7	10.8	9.0	14.2	6.0	32.3
1955.....	100.0	27.2	6.8	20.4	12.1	9.4	14.1	6.1	31.1

Source: Table 14.

Table 16

GROSS DOMESTIC PRODUCT, SECONDARY MANUFACTURING INDUSTRIES, 1935 TO 1955
(*millions of 1949 dollars*)

	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
Bakery products.....	47.7	48.5	52.2	55.2	55.1	58.0	62.7	69.4	76.2	78.0	80.7
Beverages.....	42.3	62.3	76.3	62.0	60.4	69.0	71.8	79.6	78.2	90.7	113.0
Miscellaneous food preparations.....	50.0	55.6	54.6	54.4	60.7	62.1	70.7	59.0	60.0	68.2	66.7
Tobacco products.....	13.2	14.5	16.5	18.1	19.3	20.6	23.0	28.0	30.0	32.7	37.6
Rubber products.....	26.8	29.3	34.2	29.5	32.4	35.5	47.1	45.8	44.8	45.4	54.9
Leather products.....	63.3	63.6	69.9	61.7	71.8	76.7	93.2	99.1	99.8	98.9	102.4
Textile products.....	117.2	130.8	141.6	114.1	139.2	189.9	215.5	240.2	221.3	208.3	206.4
Clothing.....	163.9	173.3	187.0	175.6	193.0	224.0	253.3	289.2	279.8	262.7	261.8
Furniture.....	28.1	32.3	35.8	33.4	34.7	41.9	48.7	46.8	50.0	51.0	54.2
Other secondary wood products.....	19.1	19.4	23.1	21.6	24.4	28.6	34.5	37.3	37.2	52.2	49.8
Secondary paper products.....	21.2	24.5	29.6	28.8	32.7	37.2	47.6	50.4	51.8	55.8	61.4
Printing and publishing.....	96.1	101.7	108.1	101.1	104.5	104.3	116.0	116.9	114.3	117.5	128.6
Primary iron and steel.....	34.9	41.4	56.5	46.4	55.3	82.1	111.1	153.4	148.7	131.6	122.1
Agricultural implements.....	13.1	14.5	17.5	17.2	12.1	18.8	24.6	33.3	39.5	39.2	36.6
Other iron and steel products.....	134.4	155.0	193.2	164.9	176.0	266.0	402.1	527.0	630.6	566.9	441.9
Motor vehicles and parts.....	134.6	131.0	166.5	131.3	122.7	201.7	275.9	330.2	339.5	297.8	213.0
Other transportation equipment.....	30.3	40.2	43.1	53.7	62.8	100.9	258.6	476.0	691.9	973.2	618.2
Secondary non-ferrous metal products.....	26.4	30.3	33.4	31.8	34.7	53.4	94.3	144.5	154.3	135.1	106.9
Electrical apparatus and supplies.....	54.6	59.4	77.4	66.7	67.6	99.6	147.0	178.1	202.2	203.3	168.1
Secondary non-metallic mineral products.....	23.9	27.9	36.2	35.0	36.4	44.4	57.4	64.2	64.3	65.7	63.4
Products of petroleum and coal.....	30.1	33.8	37.0	36.3	38.7	44.5	49.8	48.8	53.0	60.7	59.1
Secondary chemicals.....	57.6	61.7	71.5	69.6	73.2	87.4	137.3	241.7	256.3	269.3	188.9
Miscellaneous manufacturing.....	29.2	31.8	34.5	34.3	35.9	39.5	56.6	82.3	104.3	105.1	91.5
Sector adjustment.....	9.4	14.1	16.5	14.8	12.7	18.5	24.3	31.8	26.4	27.6	29.4
Total, all secondary manufacturing.....	1,267.4	1,396.9	1,612.2	1,457.5	1,556.3	2,004.6	2,723.1	3,473.0	3,854.4	4,036.9	3,356.6

Table 16 (continued)

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Bakery products.....	86.6	83.9	84.4	82.4	83.7	91.1	89.9	90.1	89.7	94.6
Beverages.....	130.8	126.2	131.0	135.9	141.5	163.8	167.9	183.4	178.6	189.2
Miscellaneous food preparations.....	67.4	74.4	84.2	87.1	94.1	85.7	90.2	90.0	91.5	95.8
Tobacco products.....	33.3	34.6	35.2	36.6	37.1	34.6	39.5	44.0	45.6	49.5
Rubber products.....	48.1	70.2	69.3	63.5	76.7	80.5	75.1	80.5	77.0	90.2
Leather products.....	111.0	98.3	85.6	88.2	83.8	77.3	84.6	90.3	84.9	90.3
Textile products.....	207.9	222.5	231.8	239.2	273.2	268.4	236.8	241.4	207.1	238.2
Clothing.....	272.9	263.8	278.6	284.6	278.1	267.2	275.8	298.8	259.6	266.1
Furniture.....	64.8	69.8	70.4	72.4	75.8	77.0	73.8	83.5	81.0	84.9
Other secondary wood products.....	51.3	58.5	56.1	52.0	55.3	59.6	60.6	67.8	65.6	75.1
Secondary paper products.....	69.3	75.0	77.7	79.9	85.2	85.3	79.7	86.7	85.6	88.3
Printing and publishing.....	147.0	166.9	181.2	188.0	199.8	199.3	196.8	209.4	219.8	224.5
Primary iron and steel.....	90.4	117.5	127.6	125.1	128.7	145.7	145.9	151.2	117.2	164.9
Agricultural implements.....	35.7	43.0	60.5	66.8	50.0	57.8	62.4	46.0	35.5	37.5
Other iron and steel products.....	378.6	406.6	427.1	411.1	418.9	460.4	457.6	461.7	417.3	447.7
Motor vehicles and parts.....	164.5	231.6	231.4	251.5	340.0	361.9	376.7	421.3	310.9	401.0
Other transportation equipment.....	241.3	207.3	194.9	195.4	140.4	215.5	307.1	378.2	339.3	241.6
Secondary non-ferrous metal products.....	89.6	90.2	92.4	87.1	91.7	102.7	93.5	90.8	86.1	99.6
Electrical apparatus and supplies.....	161.1	206.3	213.9	217.4	239.4	255.4	256.1	317.0	311.1	348.5
Secondary non-metallic mineral products.....	71.8	87.8	91.5	88.4	101.6	113.6	113.2	132.3	138.4	163.7
Products of petroleum and coal.....	59.1	64.0	70.3	77.0	86.0	97.1	104.3	114.6	119.0	136.1
Secondary chemicals.....	130.3	130.6	139.7	141.5	148.9	161.5	168.1	192.9	189.3	188.0
Miscellaneous manufacturing.....	74.6	77.3	74.4	86.7	93.4	93.9	93.0	106.9	101.9	98.5
Sector adjustments.....	26.8	32.7	30.5	27.1	27.8	36.6	35.4	36.2	35.2	36.1
Total, all secondary manufacturing.....	2,814.2	3,039.0	3,139.7	3,184.9	3,351.1	3,591.9	3,684.0	4,015.0	3,687.2	3,949.9

_____ a Sector adjustment includes: Finance, Insurance, Real Estate and Construction.
 NOTE: Estimated Total All Secondary Manufacturing for 1956: 4300 approximately.
 SOURCE: *Output, Labour and Capital in the Canadian Economy*.

Table 17

PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC PRODUCT BY SECONDARY INDUSTRIES,
AS SHOWN IN TABLE 16

	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
Bakery products.....	3.8	3.4	3.2	3.8	3.5	2.9	2.3	2.0	2.0	1.9	2.4
Beverages.....	3.3	4.4	4.7	4.3	3.9	3.4	2.6	2.3	2.0	2.2	3.4
Miscellaneous food preparations.....	3.9	3.9	3.4	3.7	3.9	3.1	2.6	1.7	1.5	1.7	2.0
Tobacco products.....	1.0	1.0	1.1	1.2	1.2	1.0	0.8	0.8	0.8	0.8	1.1
Rubber products.....	2.2	2.1	2.1	2.0	2.1	1.8	1.7	1.3	1.2	1.1	1.6
Leather products.....	5.0	4.6	4.3	4.2	4.6	3.8	3.4	2.9	2.6	2.4	3.1
Textile products.....	9.2	9.4	8.8	7.8	8.9	9.5	7.9	6.9	5.7	5.2	6.2
Clothing.....	12.9	12.4	11.6	12.0	12.4	11.2	9.3	8.3	7.3	6.5	7.8
Furniture.....	2.2	2.3	2.2	2.3	2.2	2.1	1.8	1.3	1.3	1.3	1.6
Other secondary wood products.....	1.5	1.4	1.4	1.5	1.6	1.4	1.3	1.1	1.0	1.3	1.5
Secondary paper products.....	1.7	1.8	1.8	2.0	2.1	1.9	1.7	1.5	1.3	1.4	1.8
Printing and publishing.....	7.6	7.3	6.7	6.9	6.7	5.2	4.3	3.4	3.0	2.9	3.8
Primary iron and steel.....	2.8	3.0	3.5	3.2	3.6	4.1	4.1	4.4	3.9	3.3	3.6
Agricultural implements.....	1.0	1.0	1.1	1.2	0.8	0.9	0.9	1.0	1.0	1.0	1.1
Other iron and steel products.....	10.6	11.1	12.0	11.3	11.3	13.3	14.8	15.2	16.4	14.0	13.2
Motor vehicles and parts.....	10.6	9.4	10.3	9.0	7.9	10.1	10.2	9.5	8.8	7.4	6.3
Other transportation equipment.....	2.4	2.9	2.7	3.7	4.1	5.0	9.5	13.7	18.0	24.1	18.4
Secondary non-ferrous metal products.....	2.1	2.2	2.1	2.2	2.2	2.7	3.5	4.2	4.0	3.4	3.2
Electrical apparatus and supplies.....	4.3	4.3	4.8	4.6	4.3	4.9	5.4	5.1	5.2	5.0	5.0
Secondary non-metallic mineral products.....	1.9	2.0	2.3	2.4	2.4	2.2	2.1	1.8	1.6	1.6	1.9
Products of petroleum and coal.....	2.4	2.4	2.3	2.5	2.5	2.2	1.8	1.4	1.4	1.5	1.8
Secondary chemicals.....	4.6	4.4	4.4	4.8	4.7	4.4	5.0	6.9	6.6	6.7	5.6
Miscellaneous manufacturing.....	2.3	2.3	2.1	2.4	2.3	2.0	2.1	2.4	2.7	2.6	2.7
Sector adjustment.....	0.7	1.0	1.1	1.0	0.8	0.9	0.9	0.9	0.7	0.7	0.9
Total, all secondary manufacturing.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 17 (continued)

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Bakery products.....	3.1	2.8	2.7	2.6	2.5	2.5	2.4	2.2	2.4	2.4
Beverages.....	4.6	4.2	4.2	4.3	4.2	4.5	4.6	4.6	4.8	4.8
Miscellaneous food preparations.....	2.3	2.4	2.7	2.7	2.8	2.4	2.4	2.2	2.5	2.4
Tobacco products.....	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.1	1.2	1.3
Rubber products.....	1.7	2.3	2.2	2.0	2.3	2.2	2.0	2.0	2.1	2.3
Leather products.....	3.9	3.2	2.7	2.8	2.5	2.2	2.3	2.2	2.3	2.3
Textile products.....	7.4	7.3	7.4	7.5	8.2	7.5	6.4	6.0	5.6	6.0
Clothing.....	9.7	8.7	8.9	8.9	8.3	7.4	7.5	7.4	7.0	6.7
Furniture.....	2.3	2.3	2.2	2.3	2.3	2.1	2.0	2.1	2.2	2.1
Other secondary wood products.....	1.8	1.9	1.8	1.6	1.7	1.7	1.6	1.7	1.8	1.9
Secondary paper products.....	2.5	2.5	2.5	2.5	2.5	2.4	2.2	2.2	2.3	2.2
Printing and publishing.....	5.2	5.5	5.8	5.9	6.0	5.5	5.3	5.2	6.0	5.7
Primary iron and steel.....	3.2	3.9	4.1	3.9	3.8	4.1	4.0	3.8	3.2	4.2
Agricultural implements.....	1.3	1.4	1.9	2.1	1.5	1.6	1.7	1.1	1.0	1.0
Other iron and steel products.....	13.5	13.4	13.6	12.9	12.5	12.8	12.4	11.5	11.3	11.3
Motor vehicles and parts.....	5.8	7.6	7.4	7.9	10.2	10.1	10.2	10.5	8.4	10.2
Other transportation equipment.....	8.6	6.8	6.2	6.2	4.2	6.0	8.4	9.4	9.3	6.1
Secondary non-ferrous metal products.....	3.2	3.0	2.9	2.7	2.7	2.9	2.5	2.3	2.3	2.5
Electrical apparatus and supplies.....	5.7	6.8	6.8	6.8	7.1	7.1	7.0	7.9	8.4	8.8
Secondary non-metallic mineral products.....	2.6	2.9	2.9	2.8	3.0	3.2	3.1	3.3	3.8	4.2
Products of petroleum and coal.....	2.1	2.1	2.2	2.4	2.6	2.7	2.8	2.9	3.2	3.4
Secondary chemicals.....	4.6	4.3	4.4	4.5	4.4	4.5	4.6	4.8	5.1	4.8
Miscellaneous manufacturing.....	2.7	2.5	2.4	2.7	2.8	2.6	2.5	2.7	2.8	2.5
Sector adjustment.....	1.0	1.1	1.0	0.9	0.8	1.0	1.0	0.9	1.0	0.9
Total, all secondary manufacturing.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Table 16.

Table 18

INDEX OF INDUSTRIAL PRODUCTION, BY SECTORS

(1935-39=100)

	General index of industrial production	Mining	Manufactures	Electricity and gas
1935.....	85.6	79.5	86.5	90.4
1939.....	109.7	118.0	108.1	107.5
1941.....	164.8	132.0	175.9	126.5
1944.....	212.4	104.1	242.3	153.2
1946.....	171.9	97.1	189.9	157.8
1947.....	187.8	106.2	207.7	169.3
1948.....	196.3	122.2	215.5	168.6
1949.....	199.6	131.7	217.0	176.1
1950.....	211.5	145.4	228.1	190.9
1951.....	226.5	161.8	242.1	214.2
1952.....	233.0	174.7	246.3	228.8
1953.....	248.4	185.8	263.0	241.9
1954.....	244.6	209.7	251.4	254.6
1955.....	265.8	242.6	270.1	275.7
1956.....	282.1	268.7	284.2	290.1

SOURCE: Data up to 1954 from 1955 Supplement to *Canadian Statistical Review*. Information for the years 1955 and 1956 from monthly issues of the C.S.R. For 1956, figures are unweighted averages of the indexes for the 12 months; some of these monthly figures are preliminary.

Table 19

INDICES OF INDUSTRIAL PRODUCTION

SELECTED SECONDARY MANUFACTURING INDUSTRIES

(1935-39=100)

Year	Beverages	Rubber products	Leather (total)	Textiles (total)	Clothing (total)	Printing and publishing	Petroleum and coal
1935.....	78.6	87.9	95.9	91.1	91.8	93.9	87.6
1939.....	111.5	106.6	108.7	108.2	108.0	102.2	109.4
1941.....	151.9	154.4	141.1	167.5	141.8	113.4	141.1
1944.....	190.5	149.0	149.6	162.0	147.1	114.9	171.8
1946.....	234.4	158.0	167.9	161.7	152.9	143.8	167.4
1947.....	249.4	230.7	148.7	172.9	147.7	163.3	181.2
1948.....	270.9	227.6	129.6	180.2	156.0	177.2	199.0
1949.....	285.7	208.5	133.5	186.0	159.4	183.8	218.0
1950.....	282.9	251.9	126.8	212.4	155.7	195.3	243.5
1951.....	297.7	264.3	117.0	208.6	149.7	194.7	274.9
1952.....	323.6	246.4	128.0	184.1	154.4	192.4	295.1
1953.....	336.6	264.2	136.7	187.6	167.3	204.8	324.3
1954.....	328.6	252.6	128.6	161.0	145.4	214.8	336.9
1955.....	358.3	296.3	136.7	185.3	149.0	219.5	386.7
1956.....	376.5	319.3	147.8	182.4	156.2	236.9	442.3

	Primary iron and steel (total)	Iron and steel products (total)	Trans- portation (total)	Motor vehicles	Electrical apparatus	Agri- cultural imple- ments	Brass and copper products
1935.....	74.3	80.5	90.0	98.0	83.8	88.1	82.6
1939.....	117.8	107.7	101.3	89.4	103.8	81.1	111.7
1941.....	236.7	238.0	291.8	200.9	225.8	165.7	377.6

Table 19 (continued)

1944.....	280.5	326.2	693.7	217.0	312.1	263.3	635.2
1946.....	192.8	222.6	221.5	119.9	247.3	239.7	249.9
1947.....	250.3	249.9	239.5	168.8	316.8	289.1	232.2
1948.....	272.0	270.4	232.6	168.5	328.5	405.9	219.0
1949.....	266.6	264.5	243.9	183.2	333.8	448.7	207.1
1950.....	274.2	263.2	262.2	247.6	367.6	366.0	217.7
1951.....	310.6	292.2	315.0	263.7	392.3	388.4	273.9
1952.....	310.8	292.7	373.1	274.5	393.1	418.9	266.3
1953.....	322.4	290.8	436.3	306.9	486.7	308.9	222.4
1954.....	249.7	251.8	354.9	226.4	477.8	238.9	239.4
1955.....	351.5	287.3	350.7	292.9	531.1	251.5	325.8
1956.....	417.1	328.1	371.9	312.1	550.8	N.A.	N.A.

SOURCE: Data up to 1954 from 1955 Supplement to *Canadian Statistical Review*. Information for the years 1955 and 1956 from monthly issues of the C.S.R. for 1956, figures are the unweighted averages of the indexes for the 12 months; some monthly figures are preliminary.

Table 20

GENERAL WHOLESALE PRICE INDEX, AND WHOLESALE PRICE INDEX FOR FULLY AND CHIEFLY MANUFACTURED GOODS, SELECTED YEARS

(1935-39=100)

	General wholesale price index	Fully and chiefly manufactured goods
1867.....	80.2	—
1900.....	63.2	—
1905.....	70.4	—
1910.....	78.5	—
1915.....	91.8	94.5
1920.....	203.2	208.2
1925.....	133.8	138.0
1930.....	112.9	116.1
1935.....	94.4	94.7
1940.....	108.0	109.9
1945.....	132.1	129.8
1946.....	138.9	138.0
1947.....	163.3	162.4
1948.....	193.4	192.4
1949.....	198.3	199.2
1950.....	211.2	211.1
1951.....	240.2	242.4
1952.....	226.0	230.7
1953.....	220.7	228.8
1954.....	217.0	224.2
1955.....	218.9	224.5
1956.....	225.6	231.3

SOURCE: Dominion Bureau of Statistics. Figures for 1956 are unweighted averages of the 12 monthly figures.

Table 21
GROSS VALUE OF PRODUCTION, SELECTED SECONDARY MANUFACTURING INDUSTRIES, 1945-55

	<i>(millions of current dollars)</i>										
	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954 ^b	1955 ^b
Bakery products.....	132.5	182.3	205.8	239.3	263.4	279.5	317.2	335.8	353.5	353.7	363.9
Beverages.....	202.5	230.3	251.0	285.7	313.5	334.9	375.5	410.1	442.4	444.6	469.2
Other food products.....	286.4	257.6	331.4	407.4	429.1	489.9	497.8	502.0	509.2	529.4	552.5
Tobacco products.....	122.5	119.6	146.8	154.0	172.4	188.3	179.2	215.9	214.1	226.0	250.9
Rubber products.....	181.4	159.4	196.3	194.1	178.5	239.2	311.7	286.7	290.7	264.2	322.4
Leather products.....	167.9	192.7	212.4	203.8	210.8	210.6	221.9	219.2	222.4	204.4	216.8
Textiles.....	389.2	403.0	513.2	605.0	636.8	741.3	846.5	744.1	700.7	641.4	717.2
Clothing.....	476.8	551.3	614.6	709.7	727.5	734.2	780.0	853.2	858.0	785.6	831.0
Furniture.....	80.0	78.2	126.2	142.2	157.1	172.3	190.9	204.3	231.6	233.2	261.6
Other wood products.....	71.2	77.7	91.3	98.9	93.3	87.1	103.8	118.5	117.4	107.9	96.6
Secondary paper products.....	138.1	167.3	204.3	235.5	257.0	297.0	351.9	352.3	388.6	386.3	425.1
Printing, publishing, etc.....	186.2	221.6	262.6	307.3	377.9	413.0	452.1	490.9	543.6	578.6	621.7
Agricultural implements.....	57.6	63.2	89.4	147.0	177.0	149.5	171.2	205.8	171.3	119.0	113.9
Industrial machinery.....	165.1	166.1	223.6	258.0	268.9	285.2	342.0	383.9	383.4	378.5	413.4
Primary iron and steel.....	192.3	153.1	216.3	282.2	305.7	340.5	464.6	504.0	458.9	383.6	526.3
Other iron and steel.....	533.9	442.4	535.4	633.3	667.5	749.2	926.9	1,041.3	1,083.0	1,052.5	1,182.3
Motor vehicles and parts.....	355.3	286.9	472.5	538.1	657.3	902.4	1,006.0	1,044.1	1,143.2	905.7	1,190.6
Railway rolling stock.....	181.2	162.2	159.3	237.4	246.8	194.3	300.6	332.2	338.3	283.4	247.0
Shipbuilding.....	204.6	91.9	110.1	106.8	75.6	63.7	95.2	159.1	183.2	158.2	133.1
Aircraft and parts.....	278.7	36.2	44.3	45.6	61.1	55.2	117.2	244.6	398.7	346.0	352.9
Other transportation equipment.....	9.6	10.0	12.1	13.6	22.4	24.0	22.6	23.7	26.5	25.5	22.7
Electrical non-ferrous metal products.....	193.2	179.9	215.1	268.2	267.8	290.9	392.3	378.0	371.1	342.4	411.7
Electrical apparatus and supplies.....	230.5	234.6	366.5	425.7	486.3	580.6	676.0	715.9	848.2	863.9	954.0
Secondary non-metallic mineral products.....	94.6	113.4	146.4	168.1	183.7	215.5	246.9	262.3	300.4	327.6	404.3
Products of petroleum and coal.....	270.2	286.0	361.3	492.0	533.7	616.1	709.6	780.4	823.1	1,025.1	1,155.7
Secondary chemicals.....	396.8	283.2	358.4	428.8	424.5	459.7	544.8	569.0	625.2	649.0	705.7
Miscellaneous manufacturing.....	126.3	111.5	116.9	125.1	156.4	169.3	210.8	225.6	261.3	255.3	280.6
Total secondary manufacturing.....	5,724.6	5,261.6	6,583.5	7,752.8	8,352.0	9,283.4	10,855.2	11,602.9	12,290.0	11,871.0	13,223.1

^a Includes household, office and store machinery.

^b Figures for 1954 and 1955 are from Preliminary Statements, D.B.S.

SOURCE: Census of Industry, D.B.S.

Table 22

VALUE-ADDED, SELECTED SECONDARY MANUFACTURING INDUSTRIES, 1945-55

(millions of current dollars)

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954 ^b	1955 ^b
Bakery products.....	65.6	91.3	101.4	112.4	125.0	132.2	152.6	169.2	179.9	178.1	182.7
Beverages.....	137.1	161.4	166.0	180.8	205.4	218.7	241.6	270.3	299.2	305.5	324.9
Other food products.....	94.4	78.8	93.6	115.1	130.5	143.4	137.9	154.2	164.2	166.9	176.2
Tobacco products.....	43.0	40.0	49.2	57.7	58.5	65.2	59.0	70.8	75.0	79.7	87.2
Rubber products.....	98.8	93.5	110.7	107.0	101.7	134.1	161.2	162.5	172.7	153.7	181.1
Leather products.....	71.3	82.3	86.6	86.9	91.2	87.4	84.9	101.5	103.9	100.9	106.7
Textiles.....	163.7	178.8	213.7	261.8	285.6	315.6	337.9	312.6	299.2	283.0	306.8
Clothing.....	222.3	263.0	300.5	345.0	352.7	352.9	370.7	405.1	414.5	374.1	395.6
Furniture.....	42.1	42.5	65.5	76.4	85.3	90.6	98.5	106.1	121.5	122.8	133.1
Other wood products.....	31.5	34.0	40.0	43.5	38.4	36.0	44.7	51.2	50.3	50.3	37.2
Secondary paper products.....	60.7	75.6	87.3	97.2	108.9	127.0	148.6	152.1	167.4	156.6	177.5
Printing, publishing, etc.....	131.9	154.4	177.9	208.2	250.2	274.1	295.6	326.7	364.4	384.4	415.0
Agricultural implements.....	30.1	29.2	38.2	63.4	79.2	68.4	72.7	93.8	79.1	50.6	52.9
Industrial machinery.....	111.0	106.7	140.1	161.2	166.5	174.3	204.1	239.1	239.0	230.7	242.1
Primary iron and steel.....	89.9	71.6	92.9	125.3	136.2	154.5	209.5	233.6	217.0	216.4	282.8
Other iron and steel.....	297.1	254.0	309.1	359.4	379.0	419.9	505.0	567.5	605.8	557.3	608.9
Motor vehicles and parts.....	120.7	104.2	175.8	213.3	263.3	386.3	388.1	394.3	414.9	296.9	406.7
Railway rolling stock.....	92.8	74.7	82.4	105.7	109.2	79.8	119.9	145.8	153.7	116.8	104.2
Shipbuilding.....	141.6	64.5	71.2	66.1	45.9	37.1	58.5	96.7	115.5	100.6	83.8
Aircraft and parts.....	161.7	28.7	27.4	26.5	35.7	35.8	79.4	127.3	260.5	184.4	207.1
Other transportation equipment.....	5.3	5.7	6.8	7.4	12.4	13.2	11.5	14.2	16.6	15.8	13.4
Secondary non-ferrous metal products.....	90.7	78.9	85.4	101.4	107.2	108.8	143.6	148.2	148.0	133.2	143.2
Electrical apparatus and supplies.....	135.9	130.0	200.9	241.3	269.3	315.1	353.6	395.9	457.5	459.9	474.4
Secondary non-metallic mineral products.....	55.1	66.8	83.2	97.7	108.0	127.3	145.3	151.6	174.0	190.5	233.1
Products of petroleum and coal.....	65.6	79.0	84.1	97.1	117.8	144.5	179.9	225.8	211.6	369.5	411.9
Secondary chemicals.....	201.8	145.8	165.6	188.3	204.9	218.9	261.1	295.4	315.1	327.2	354.3
Miscellaneous manufacturing.....	50.6	60.2	68.3	75.5	94.6	99.6	120.9	135.2	154.8	149.1	162.9
Total secondary manufacturing.....	2,812.3	2,595.6	3,123.8	3,621.6	3,962.6	4,360.7	4,986.3	5,546.7	5,975.3	5,754.9	6,305.7

a Includes household, office and store machinery.

b Figures for 1954 and 1955 are from Preliminary Statements, D.B.S.

Source: Census of Industry, D.B.S.

Table 23

SECONDARY MANUFACTURED EXPORTS BY INDUSTRY, 1939, 1947, 1953

(millions of current dollars)

Industry	1939		1947		1953	
	(\$ million)	Percent of total %	(\$ million)	Percent of total %	(\$ million)	Percent of total %
Alcoholic beverages.....	8	5	28	5	66	9
Rubber products.....	16	10	25	4	8	1
Leather products.....	8	5	13	2	10	1
Textiles and clothing.....	13	8	47	8	22	3
Furniture.....	neg.	—	2	neg.	1	neg.
Secondary paper products ^a	9	5	35	6	22	3
Primary iron and steel ^b	10	6	39	7	85	11
Agricultural implements.....	7	4	42	7	74	10
Motor vehicles and parts.....	26	16	92	16	75	10
Ships and vessels.....	0	—	26	5	20	3
Other products of iron and steel..	20	12	94	16	94	13
Aircraft and parts.....	0	—	6	1	40	5
Aluminum products.....	1	1	7	1	5	1
Asbestos products.....	1	1	1	neg.	1	neg.
Electrical apparatus.....	6	4	26	5	42	6
Petroleum products.....	1	1	4	1	1	neg.
Medicinal and pharmaceutical preparations.....	2	1	4	1	6	1
Paints, pigments and varnishes....	2	1	7	1	4	1
Scientific and educational equipment.....	4	3	5	1	6	1
Other ^c	23-33	17	72-87	13	143-168	21
Total secondary.....	155-165	100	575-590	100	725-750	100

a Excludes newsprint and waste paper.

b Primary iron and steel includes ferro alloys and scrap.

c The largest single item in the "other" category in 1953 was synthetic rubber which is estimated at some \$35 million.

NOTE: Percentages are based on the mid-point of the range shown for the total and will not necessarily add to 100 because of rounding.

Table 24

EXPORTS AND GROSS VALUE OF PRODUCTION IN SELECTED SECONDARY MANUFACTURING INDUSTRIES, 1939, 1947, 1953

	1939			1947			1953		
	GVP \$million	Exports \$million	Percentage %	GVP \$million	Exports \$million	Percentage %	GVP \$million	Exports \$million	Percentage %
Beverages									
Breweries	43.6	.2	neg.	114.5	4.7	4	200.9	2.9	1
Distilled liquors	18.8	7.9	42	68.4	23.7	35	123.3	63.3	51
Wines	4.0	neg.	—	12.2	neg.	—	9.7	neg.	—
Bakery products	76.0	.3	neg.	205.8	.4	neg.	353.5	.3	neg.
Tobacco products	69.6	neg.	—	146.8	1.6	1	214.1	.4	neg.
Rubber products	69.9	15.7	23	196.3	24.9	13	290.7	8.2	3
Footwear	22.2	5.1	23	35.9	8.1	23	35.9	.3	1
Tires and tubes	31.5	8.0	25	112.9	12.0	11	156.6	6.0	4
Others	16.3	2.6	16	47.5	4.8	10	98.3	1.9	2
Leather products	81.5	8.1	10	212.4	13.0	6	222.4	9.6	4
Footwear	40.9	.7	2	104.1	6.1	6	131.3	2.5	2
Textile products									
Cotton	90.6	3.3	4	191.3	9.7	5	231.2	3.4	2
Wool	39.5	.5	1	125.0	.9	1	142.9	5.8	4
Synthetic textiles and silk	25.4	2.3	9	84.9	9.4	11	146.4	5.2	4
Clothing	229.7	10.0	4	614.6	17.0	3	858.0	4.4	1
Furniture	25.6	.2	8	126.2	1.5	1	231.6	.5	—
Secondary paper products	61.5	8.8	14	204.3	34.5	17	388.6	21.5	6
Primary iron and steel	75.9	7.4	10	216.3	16.0	7	458.9	53.6	12
Agricultural implements	16.0	7.0	44	89.4	42.3	47	171.3	74.3	43
Industrial machinery	35.1	4.8	14	120.7	30.1	25	243.4	32.9	14
Industrial engines	n.a.	.2	—	n.a.	4.5	—	18.0	6.4	36
Logging and sawmill machinery	n.a.	n.a.	—	n.a.	1.6	—	8.9	1.1	12
Metal working machinery	n.a.	.9	—	n.a.	4.8	—	19.6	7.1	36
Mining machinery	n.a.	n.a.	—	n.a.	2.6	—	23.9	3.1	13
Food processing machinery	n.a.	neg.	—	n.a.	neg.	—	7.5	.1	1

Table 24 (continued)

	1939			1947			1953		
	GVP \$million	Exports \$million	Percentage %	GVP \$million	Exports \$million	Percentage %	GVP \$million	Exports \$million	Percentage %
Motor vehicles and parts.....	146.2	25.5	17	472.5	91.6	19	1,143.2	75.3	7
Passenger cars.....	71.1	14.4	20	182.2	33.6	18	539.5	36.1	7
Trucks.....	28.1	8.2	29	146.7	37.9	26	199.1	22.3	11
Railway rolling stock.....	60.7	8.7	14	159.3	19.0	12	338.3	9.0	3
Aluminum products.....	7.2	.5	7	39.8	7.3	18	92.7	4.5	5
(excludes semi-fabricated)									
Asbestos products.....	1.8	.5	28	7.1	.6	9	22.0	.6	3
Petroleum products.....	104.6	.8	1	288.5	3.8	1	695.0	.5	neg.
(1947 excludes Newfoundland)									
Medicinal and pharmaceutical products.....	27.2	1.9	7	70.3	4.4	6	93.6	5.7	6
Paints, pigments and varnishes.....	25.9	1.6	6	69.9	7.3	10	113.2	3.6	3
Soap and toilet preparations.....	27.1	1.1	4	70.1	3.2	5	119.7	.1	neg.
Musical instruments.....	1.1	neg.	—	4.4	.5	11	9.7	.6	6
Scientific and educational equipment.....	6.7	3.5	52	21.6	5.0	23	61.0	5.8	10
Electrical apparatus and supplies ^a	110.5	6.1	6	400.8	25.9	7	950.3	42.3	5
Miscellaneous apparatus.....	36.3	1.1	3	148.4	9.8	7	236.6	7.8	3
Wire and cable.....	20.7	.6	3	77.5	5.5	7	124.5	6.1	5
Batteries.....	6.4	.3	5	22.3	2.7	12	26.7	.4	2
Major appliances.....	15.9	3.4	21	58.1	4.9	8	141.7	1.6	1
Refrigerators.....	7.0	.6	9	28.6	.8	3	83.3	.5	1
Washing machines.....	4.2	1.0	24	16.2	1.7	11	26.1	.6	2
Electric ranges.....	2.0	.9	46	9.8	1.7	17	15.0	.12	1
Electronic equipment.....	15.1	.2	1	52.0	2.8	5	206.6	23.4	11

^a Electrical apparatus and supplies figures in the 1939 column are for 1937.

NOTE: Figures are not precise because of difficulty in reconciling trade and production figures.

SOURCE: Dominion Bureau of Statistics, Trade of Canada and Census of Industry.

Table 25

REGIONAL DISTRIBUTION OF POPULATION AND NET VALUE OF PRODUCTION IN MANUFACTURING AND OTHER COMMODITY PRODUCING SECTORS, 1953

	Canada	New-foundland	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yukon and N.W.T.
Population (thousands).....	14,781	383	106	663	536	4,269	4,897	809	861	1,002	1,230	25
%.....	100.0	2.6	.7	4.5	3.6	28.9	33.1	5.5	5.8	6.8	8.3	.2
Secondary manufacturing (\$ million).....	5,991	12	3	87	58	1,830	3,409	180	51	143	218	n.a.
%.....	100.0	.2	.05	1.5	1.0	30.5	56.9	3.0	.9	2.4	3.6	—
Primary manufacturing (\$ million).....	1,999	45	2	41	63	595	721	49	29	57	397	n.a.
%.....	100.0	2.3	.1	2.1	3.2	29.8	36.1	2.5	1.5	2.9	20.0	—
Agriculture (\$ million).....	2,239	n.a.	17	31	37	321	538	175	633	418	69	n.a.
%.....	100.0	—	.8	1.4	1.7	14.3	24.1	7.8	28.3	18.7	3.1	—
Resource industries (\$ million).....	1,859	58	4	97	53	474	464	46	54	262	325	20
%.....	100.0	3.1	.2	5.2	2.9	25.5	25.0	2.5	2.9	14.1	17.4	1.1
Construction (\$ million).....	2,454	38	7	73	52	586	853	123	120	291	310	n.a.
%.....	100.0	1.5	.3	3.0	2.1	23.9	34.8	5.0	5.0	11.9	12.6	—
Secondary manufacturing % of commodity production...	41.2%	7.8%	9.1%	26.4%	22.1%	48.1%	57.0%	31.4%	5.7%	12.2%	16.5%	—

Due to rounding percentage figures may not always add to 100.0.

Table 26

PERCENTAGE DISTRIBUTION OF EMPLOYMENT AND GROSS VALUE OF PRODUCTION IN
SELECTED SECONDARY MANUFACTURING INDUSTRIES, MAJOR CANADIAN CITIES, 1953

Industry	Canada	Montreal	Toronto	Hamilton	Windsor	Combined percentage four cities %
Bakery products (000's)	40.3	7.6	6.3	1.6	.6	40.0
..... (\$ million) GVP	353.5	72.0	52.5	11.3	4.0	39.5
Beverages	21.9	3.6	1.1	.2	.1	.5
..... Employment	442.5	76.6	17.2	2.4	1.5	.3
..... GVP						
Tobacco products	9.5	5.3	—	—	—	55.6
..... Employment	214.1	102.8	.8	—	—	48.4
..... GVP						
Rubber products	22.6	2.4	6.2	—	—	38.9
..... Employment	290.7	22.1	94.2	—	—	40.0
..... GVP						
Leather products	33.1	10.1	3.6	.3	—	42.3
..... Employment	222.4	59.8	26.1	2.2	—	39.6
..... GVP						
Clothing	120.0	49.1	22.7	3.9	.3	63.3
..... Employment	858.0	389.0	168.2	22.7	1.8	68.0
..... GVP						
Textiles	73.2	12.7	5.5	3.1	1.2	30.7
..... Employment	700.7	106.4	65.2	26.5	12.7	30.1
..... GVP						
Furniture	29.8	5.4	4.4	.3	.1	34.2
..... Employment	231.6	44.8	44.5	1.8	1.4	39.9
..... GVP						
Printing, publishing, etc.	66.5	13.7	20.7	1.6	.7	55.2
..... Employment	543.8	120.1	191.7	14.5	6.6	61.2
..... GVP						
Industrial machinery	30.7	6.1	9.7	1.4	.7	58.3
..... Employment	286.4	56.9	108.8	15.5	8.4	64.5
..... GVP						

Table 26 (continued)

Industry	Canada	Montreal	Toronto	Hamilton	Windsor	Combined percentage four cities
		%	%	%	%	%
Primary iron and steel.....	35.0 458.9	2.7 33.6	7.7 7.3	12.9 208.2	36.9 45.4	n.a. n.a.
Motor vehicles and parts.....	56.3 1,143.3	.3 2.6	.5 .2	— —	— —	n.a. n.a.
Railway rolling stock.....	35.4 338.3	16.8 156.9	47.4 46.4	1.3 9.2	3.7 2.7	n.a. n.a.
Secondary non-ferrous metals.....	26.9 371.1	6.4 179.9	23.8 48.4	8.2 116.5	30.5 31.3	1.1 12.5
Electrical apparatus.....	76.9 848.2	18.1 177.8	23.5 21.0	25.0 308.7	32.5 36.4	11.1 110.8
Petroleum and coal products.....	17.1 823.1	3.8 275.9	22.2 33.4	3.0 25.1	17.5 3.0	.9 40.8
Chemical products.....	36.5 625.3	9.1 126.0	24.9 20.2	10.8 220.8	29.6 35.3	1.3 46.4
Total secondary.....	1,042.3 12,290.3	236.9 2,725.7	22.7 22.2	192.1 2,185.3	18.4 17.8	60.9 800.2
						5.8 6.5
						37.8 687.2
						3.6 5.6
						49.7 52.1

Table 27

CONCENTRATION OF EMPLOYMENT AND VALUE-ADDED IN SELECTED SECONDARY MANUFACTURING INDUSTRIES IN ONTARIO AND QUEBEC

	1926		1933		1939		1946		1953	
	Ontario and Quebec		Ontario and Quebec		Ontario and Quebec		Ontario and Quebec		Ontario and Quebec	
	only	%	only	%	only	%	only	%	only	%
Bakery products.....	Employment	47.4	77.6	47.2	75.7	75.6	46.8	73.2	42.7	73.9
	Value-added	48.3	75.3	48.6	76.0	74.9	46.0	70.8	42.8	72.1
Beverages.....	Employment	36.1	70.8	39.2	76.0	78.6	38.3	73.9	39.3	74.9
	Value-added	29.2	68.4	39.9	77.3	79.7	37.1	65.9	43.5	76.0
Tobacco products.....	Employment	15.4	98.9	26.8	98.7	99.6	18.8	99.7	20.0	98.7
	Value-added	10.4	99.6	20.7	99.6	99.7	20.8	99.8	14.5	99.5
Rubber products.....	Employment	69.3	99.6	73.3	99.5	99.8	71.9	99.8	72.0	99.9
	Value-added	75.3	99.5	81.9	100.0	99.9	81.6	99.8	81.8	99.8
Leather products.....	Employment	41.7	94.5	43.0	95.4	95.3	39.3	94.8	41.1	95.1
	Value-added	48.6	95.2	51.3	95.8	95.8	46.0	93.7	44.9	95.0
Clothing.....	Employment	52.0	88.8	46.7	92.2	92.0	41.1	91.6	32.8	91.1
	Value-added	53.0	93.0	47.2	93.4	92.5	35.8	92.6	32.1	91.7
Textiles.....	Employment	41.0	90.9	42.5	94.8	94.9	36.0	93.9	38.4	94.5
	Value-added	42.4	91.8	41.3	94.8	94.8	40.8	93.4	43.8	95.1
Furniture.....	Employment	71.3	92.7	63.1	86.9	85.2	49.1	83.7	50.4	84.0
	Value-added	69.1	90.9	55.7	86.1	83.8	52.0	82.9	51.7	84.1
Printing, publishing, etc.....	Employment	50.6	75.2	50.1	75.1	75.7	52.1	77.2	50.6	77.3
	Value-added	52.0	75.3	51.9	74.8	76.0	54.1	78.7	52.6	78.5
Agricultural implements ^a	Employment	n.a.	—	95.1	97.8	97.9	94.5	97.2	90.1	91.5
	Value-added	n.a.	—	92.8	92.8	97.4	94.1	96.4	89.2	90.2
Industrial machinery.....	Employment	66.1	89.3	66.9	96.6	99.3	53.9	85.9	54.4	83.8
	Value-added	64.3	88.4	43.9	63.1	94.9	57.5	87.3	55.6	90.8

Table 27 (continued)

	1926		1933		1939		1946		1953	
	Ontario only	Ontario and Quebec	Ontario only	Ontario and Quebec	Ontario only	Ontario and Quebec	Ontario only	Ontario and Quebec	Ontario only	Ontario and Quebec
	%	%	%	%	%	%	%	%	%	%
Primary iron and steel.....	n.a.	—	56.9	79.9	56.7	74.6	62.3	77.6	69.8	81.8
Value-added	n.a.	—	71.3	91.1	66.0	78.7	72.9	90.3	77.1	89.1
Motor vehicles and parts ^b	n.a.	—	97.5	97.9	95.1	95.9	96.7	97.8	96.3	98.3
Value-added	n.a.	—	98.6	98.6	96.3	97.2	96.7	97.4	97.5	98.6
Railway rolling stock ^b	48.5	79.8	13.0	55.7	20.6	62.2	20.3	67.1	20.3	67.7
Value-added	64.5	86.2	15.8	53.4	21.4	64.5	25.5	73.4	25.6	74.1
Shipbuilding ^b	n.a.	—	13.9	58.6	14.4	53.9	12.5	46.0	16.8	64.1
Value-added	n.a.	—	18.8	59.5	16.9	45.1	11.3	36.7	15.8	63.7
Aircraft and parts ^b	n.a.	—	—	— ^c	50.3	88.5	18.2	96.6	53.7	92.6
Value-added	n.a.	—	—	—	51.4	86.5	12.9	97.4	61.4	96.5
Secondary non-ferrous metals..	70.8	92.8	67.5	94.2	69.4	94.9	68.4	95.1	65.1	94.5
Value-added	69.3	93.1	71.3	95.1	74.3	95.2	70.7	96.1	67.6	94.9
Electrical apparatus.....	64.6	99.0	73.9	97.5	74.2	98.9	68.9	98.0	71.1	97.8
Value-added	70.7	98.9	77.9	97.7	75.6	98.9	72.8	98.0	74.4	98.2
Petroleum and coal products...	52.5	72.7	54.2	72.0	50.9	69.5	51.3	70.1	47.4	70.2
Value-added	44.2	64.9	48.7	76.3	37.6	69.5	44.6	74.9	36.3	70.1
Chemical products.....	49.8	90.8	52.8	89.9	52.2	90.9	52.6	91.8	51.0	93.2
Value-added	53.1	83.6	56.2	89.4	55.9	90.6	55.9	91.9	61.8	92.6
Total all secondary manufacturing.....	53.4	87.1	51.1	86.4	52.1	87.2	51.0	86.5	52.3	87.1
Value-added	54.3	86.0	52.6	86.0	54.7	86.3	52.5	85.5	56.4	87.0

^a Included with industrial machinery in 1926.^b Data for 1926 are for total transportation equipment.^c Aircraft included with shipbuilding in 1933.

SOURCE: Census of Industry.

Table 28

CAPITAL INVESTMENT IN CANADA BY SECTORS,
SELECTED YEARS*(millions of current dollars)*

	1926	1929	1933	1939	1946	1949	1951	1953	1955
Agriculture and fishing.....	97	130	25	79	182	419	515	546	426
Resource industries ^a	66	128	28	67	121	468	663	778	805
Primary manufacturing ^b	222	374	42	98	337	175	278	360	362
Secondary manufacturing ^b						346	505	603	585
Transportation, other public utilities and construction..	146	302	39	100	215	429	552	819	867
Trade, finance and commercial services.....	50	131	23	62	137	293	412	526	561
Housing, institutional services	250	301	91	215	487	966	1,057	1,385	1,907
Government departments....	86	152	79	144	224	406	595	824	837
Total.....	917	1,518	327	765	1,703	3,502	4,577	5,841	6,350

(percentage distribution)

	1926	1929	1933	1939	1946	1949	1951	1953	1955
Agriculture and fishing.....	10.5	8.6	7.6	10.3	10.7	12.0	11.2	9.4	6.7
Resource industries ^a	7.2	8.4	8.6	8.8	7.1	13.3	14.5	13.3	12.7
Primary manufacturing ^b	24.2	24.7	12.9	12.8	19.8	5.0	6.1	6.2	5.7
Secondary manufacturing ^b						9.9	11.0	10.3	9.2
Transportation, other public utilities and construction..	15.9	19.9	11.9	13.1	12.6	12.2	12.1	14.0	13.7
Trade, finance and commercial services.....	5.5	8.6	7.0	8.1	8.0	8.4	9.0	9.0	8.8
Housing, institutional services	27.3	19.8	27.8	28.1	28.6	27.6	23.1	23.7	30.0
Government departments....	9.4	10.0	24.2	18.8	13.2	11.6	13.0	14.1	13.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a Excludes oil and gas pipelines.

b Data for manufacturing since 1949 furnished by Economics Branch, Trade and Commerce, and Dominion Bureau of Statistics.

SOURCE: *Private and Public Investment in Canada*, various issues. Figures are adjusted and relate only to new investment in machinery and equipment; repair and maintenance expenditures are excluded.

Table 29

CAPITAL INVESTMENT IN SELECTED SECONDARY MANUFACTURING INDUSTRIES, 1948-55

(millions of current dollars)

	1948	1949	1950	1951	1952	1953	1954	1955
Bakery products.....	14.6	9.4	14.7	12.9	15.1	15.2	14.9	15.0
Beverages.....	28.8	22.6	19.8	20.1	18.8	24.0	30.2	30.5
Tobacco products.....	3.2	2.0	2.6	2.2	2.3	3.2	2.7	4.4
Rubber products.....	7.2	6.3	4.7	7.9	10.1	15.2	17.0	15.1
Leather products.....	3.6	2.4	2.5	2.7	2.4	3.1	2.5	2.3
Textile products.....	35.3	30.3	25.8	38.8	31.0	27.8	27.3	28.0
Clothing.....	12.4	13.8	12.3	12.6	12.5	13.6	7.5	9.2
Furniture.....	3.5	2.8	3.0	3.6	3.3	6.0	4.2	7.0
Printing, publishing, etc.....	19.4	20.0	17.5	22.4	14.0	16.6	29.3	24.1
Agricultural implements.....	6.2	4.2	3.3	4.3	6.2	4.2	3.0	2.4
Industrial machinery.....	10.5	12.2	10.7	12.5	22.4	19.4	21.0	10.0
Primary iron and steel.....	19.3	11.6	6.9	50.3	72.9	49.9	32.3	34.5
Motor vehicles and parts.....	10.0	11.4	18.7	35.2	43.0	72.0	50.8	36.4
Railway rolling stock.....	4.7	6.0	4.1	4.5	9.6	9.4	6.7	4.0
Shipbuilding.....	0.9	2.0	1.8	2.5	2.9	3.5	2.6	2.7
Aircraft and parts.....	0.9	2.2	3.4	6.8	8.7	12.5	8.0	10.6
Secondary non-ferrous metals.....	6.3	10.4	6.3	8.6	14.0	12.0	6.4	8.9
Electrical apparatus.....	16.7	16.3	13.8	31.9	43.4	36.0	28.8	32.5
Petroleum and coal products.....	43.9	28.4	27.7	60.5	80.5	83.2	92.5	109.1
Secondary chemicals.....	29.4	30.9	14.6	45.5	39.2	23.1	25.7	27.9
Total selected secondary.....	276.9	245.2	214.2	385.8	452.3	449.9	413.4	414.6
Residue.....	68.3	70.0	62.5	73.4	80.5	98.5	89.9	114.4
Total secondary manufacturing...	345.2	315.2	276.7	459.2	532.8	548.4	503.3	529.0
Capital items charged to operating expenses.....	34.5	31.5	27.7	45.9	53.3	54.8	50.3	55.9
Grand total, secondary manufacturing.....	379.7	346.7	304.4	505.1	586.1	603.2	553.6	584.9
Total primary manufacturing...	196.3	175.1	172.6	277.7	396.2	360.1	268.5	361.6
Total manufacturing.....	576.0	521.8	477.0	782.8	982.3	963.3	822.1	946.5
% secondary manufacturing is of Total manufacturing.....	65.9	66.4	63.8	64.5	59.7	62.6	67.3	61.8

NOTES: 1. Data from Department of Trade and Commerce, Economics Branch; figures here differ slightly from those published in *Private and Public Investment in Canada*, various issues, due to minor omissions and double-counting.

2. The secondary manufacturing total excludes one or two sub-groups which could not be separated from the primary manufacturing total.

Table 30

**PERCENTAGE DISTRIBUTION OF CAPITAL INVESTMENT IN
SELECTED SECONDARY MANUFACTURING INDUSTRIES,
1948-55**

	1948	1949	1950	1951	1952	1953	1954	1955
Bakery products.....	4.2	3.0	5.3	2.8	2.8	2.8	3.0	2.8
Beverages.....	8.3	7.2	7.2	4.4	3.5	4.4	6.0	5.8
Tobacco products.....	0.9	0.6	0.9	0.5	0.4	0.6	0.5	0.8
Rubber products.....	2.1	2.0	1.7	1.7	1.9	2.8	3.4	2.9
Leather products.....	1.0	0.8	0.9	0.6	0.5	0.6	0.5	0.4
Textile products.....	10.2	9.6	9.3	8.4	5.8	5.1	5.4	5.3
Clothing.....	3.6	4.4	4.4	2.7	2.3	2.5	1.5	1.7
Furniture.....	1.0	0.9	1.1	0.8	0.6	1.1	0.8	1.3
Printing, publishing, etc.....	5.6	6.3	6.3	4.9	2.6	3.0	5.8	4.6
Agricultural implements.....	1.8	1.3	1.2	0.9	1.2	0.8	0.6	0.5
Industrial machinery.....	3.0	3.9	3.9	2.7	4.2	3.5	4.2	1.9
Primary iron and steel.....	5.6	3.7	2.5	11.0	13.7	9.1	6.4	6.5
Motor vehicles and parts.....	2.9	3.6	6.8	7.7	8.1	13.1	10.1	6.9
Railway rolling stock.....	1.4	1.9	1.5	1.0	1.8	1.7	1.3	0.8
Shipbuilding.....	0.3	0.6	0.7	0.5	0.5	0.6	0.5	0.5
Aircraft and parts.....	0.3	0.7	1.2	1.5	1.6	2.3	1.6	2.0
Secondary non-ferrous metals.....	1.8	3.3	2.3	1.9	2.6	2.2	1.3	1.7
Electrical apparatus.....	4.8	5.2	5.0	6.9	8.1	6.6	5.7	6.1
Petroleum and coal products.....	12.7	9.0	10.0	13.2	15.1	15.2	18.4	20.6
Secondary chemicals.....	8.5	9.8	5.3	9.9	7.4	4.2	5.1	5.3
Residue.....	19.8	22.2	22.6	16.0	15.1	18.0	17.9	21.6

Total (excluding capital items

charged to operating expenses)

100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
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Due to rounding, figures may not always add to 100.

SOURCE: Table 29.

Table 31

SOME KEY RATES OF THE CANADIAN TARIFF^a

Note: The following table and the quotation which refers to it are from Chapter VI and Table VI-A of *Canadian Commercial Policy*:

"In order to point up the distinction between the rates which really matter and those which are of less importance, an attempt has been made in the following brief enumeration to draw together some of the "key" rates of the Canadian tariff. Since a list of this kind is only useful if it is short, and since the difference between rates is sometimes fairly minor, a number of rates which have not been included might well have found a place in a schedule of this kind. What can be said, however, is that if the rates included in this list were reduced to zero, the amount of protection remaining in the Canadian tariff would be so small that controversy over the tariff would dwindle into insignificance. On the other hand, if some of the rates included in this list were doubled the Canadian tariff would become a very high and restrictive one . . . (Account would have to be taken of the consequential effects on other protected industries arising from an increase in the rates on some commodities. For example, if the rates on types of machinery used by protected industries were doubled, this would improve the position of the industrial machinery industry, but worsen the competitive position of protected users of machinery)."

Tariff Item		BP	Ad valorem equivalent	MFN	Ad valorem equivalent
18	Butter				
	Australian Trade Agreement . . . 5¢	8¢	<u>Prohibition</u>	12¢	<u>Prohibition</u>
	New Zealand Trade Agreement . 5¢				
	Cocoa, chocolate and confectionery	10%		20%	
45a	Prepared cereal foods	20%		20%	
87	Fresh vegetables . . out-of-season . .	Free		10%	
	. . . in-season—per lb.	Free		1-3¼¢	
89	Canned vegetables—per lb.	Free		1½-2¢	
90c	Vegetable juices	12½%		20%	
90e	Frozen vegetables	10%		17½%	
91	Soups	15%		20%	
92	Fresh fruits out-of-season . .	Free		10%	
 in-season—per lb.	Free		1-2¢	
134	Refined sugar per cwt.	\$1.09		\$1.89	35%
135	Raw sugar 96 degrees . . per cwt. . .	\$0.28	7%	\$1.28	32-38%
141	Candy, jelly powder, custards, etc. . .	12½%		22½%	
143a	Cigarettes per lb.	\$2.00		\$2.00	
	and	15%		15%	over 15%
178	Advertising matter per lb.	5¢		10¢	
	but not less than			25%	25%

^a This is not a tariff schedule. The terminology used is not that of the tariff. Descriptions have been abbreviated and in some cases paraphrased. The third column has been omitted for the reasons discussed in the text. For precise information, reference should be made to the Customs Tariff, the Customs Act, the Regulations of the Department of National Revenue, Tariff Board decisions and the expert knowledge of customs brokers and officials. The ad valorem equivalents shown refer to 1954. When one of the rates shown under an item is much more important than the others it has been underlined.

Table 31 (continued)

Tariff Item		BP	Ad valorem equivalent	MFN	Ad valorem equivalent
192	Prepared roofings, etc.....	15%		22½%	
197	Paper of all kinds.....	15%		22½%	
199	All manufactures of paper.....	17½%		25%	
199b	Paperboard containers.....	4/5¢	1-3%	20%	
208t	Chemicals and drugs not produced in Canada.....	Free		15%	
220a(ii)	Chemical compounds and preparations.....	25%		25%	
228(i)	Toilet soap.....	15%		22½%	
(ii)	Soap powders.....	15%		20%	
234	Cosmetics.....	15%		22½%	
248	Paints....per gal.....	75¢		85¢	20%
249	Varnishes, lacquers, etc....per gal. and	15¢ 5%		15¢ 15%	20%
267d	Crude petroleum for refiners.....	Free		Free	
269(i)	Gasoline....per gal.....	¾¢		1¢	6%
287	All china tableware.....	Free		25%	
318	Window glass.....	Free		7½%	
321	Window glass, plate glass n.o.p. ^a ..	Free		7½%	
351	Covered wire and cable.....	20%		20%	
352	Manufactures of brass and copper.	20%		20%	
354	Manufactures of aluminum.....	15%		22½%	
378d	Hot-rolled bars of iron and steel...	Free		12½%	
380b	Hot or cold-rolled plates.....	Free		\$6.00	6-7%
381a	Hot or cold-rolled sheets.....	7½%		20%	
383b	Sheets, plates etc. coated with tin...	15%		15%	
383c	Sheets, plates etc. coated with zinc..	7½%			
384	Hot-rolled skelp.....	Free		5%	
385	Sheets, plates, strip etc. not less than 5¢ per lb. ^b	Free		12½%	
388	Structural steel not less than 35 lbs. per yd. (per ton).....	Free		\$3.00	2.5%
388b	Structural steel n.o.p. (per ton)....	\$4.00		\$7.00	5.5%-6.5%
388d	Structural steel drilled or manufactured.....	17½%		25%	
397a	Pipes and tubes (not more than 10½ inches in diameter).....	15%		27½%	
397b	Pipes and tubes (more than 10½ inches in diameter).....	10%		15%	
401	Iron or steel wire n.o.p.....	15%		20%	
414	Typewriters.....	Free		20%	
414c	Office machinery.....	Free		10%	
415	Vacuum cleaners.....	5%		20%	
415a	Electric refrigerators.....	17½%		20%	
415b	Washing machines.....	15%		22½%	
415d	Sewing machines.....	5%		15%	
427	Machinery n.o.p.....	10%		22½%	
427a	Machinery not produced in Canada	Free		7½%	
428c	Engines or boilers.....	15%		20%	
428e	Diesel and semi-diesel engines....	Free		20%	
429	Cutlery of all kinds.....	Free-15%		7½%-25%	

a n.o.p. is the abbreviation for "not otherwise provided for".

b In recent months following the increase in steel prices this has become the ruling rate for sheet, plate, hoop, band or strip of iron and steel.

Table 31 (Continued)

Tariff Item	BP	Ad valorem equivalent	MFN	Ad valorem equivalent
430 Nuts and bolts per cwt. and.....	25¢ 7½%		50¢ 17½%	— 17.7%
430e Nails n.o.p.	15%		27½%	
433 Bathtubs, etc. of iron and steel....	5%		20%	
434(2) Locomotives.....	15%		25%	
438 Railway cars.....	15%		22½%	
438a Automobiles, trucks, and buses....	Free		17½%	
438b List of automobile parts (a) Not made in Canada..... (b) Made in Canada.....	Free Free		Free 17½%	
438c List of automobile parts and components. If not made in Canada and content achieved.....	Free		Free	
438d List of parts for trucks etc. If not made in Canada and content achieved.....	Free		7½%	
438e Parts n.o.p.....	Free		25%	
443 Cooking and heating apparatus...	15%		22½%	
445 Electric light fixtures and appliances n.o.p.....	20%		22½%	
445c Electric telephone apparatus.....	10%		22½%	
445d Electric wireless or radio apparatus	Free		20%	
445f,g,k Electric dynamos, motors, apparatus etc.....	15%		22½%	
446a Manufactures of iron and steel n.o.p.....	10%		22½%	
506 Manufactures of wood n.o.p.....	17½%		20%	
519 Furniture.....	15%		25%	
522c Cotton yarn..... and per lb.....	15%		17½% 3¢	—20%
523 Cotton fabrics..... and per lb.....	15%		15% 3¢	—19.5%
523a Bleached cotton fabrics..... and per lb.....	17½%		17½% 3¢	—20%
523b Printed cotton fabrics (over 80¢ per lb.)..... and per lb.....	17½%		17½% 3¢	—20%
532 Cotton clothing..... Ex. tablecloths, sheets, etc.....	25% 22½%		25% 22½%	
554b Wool fabrics..... and per lb..... The ruling rate on wool fabric from the U.K. is the BP Specific maximum of 50¢ per lb.	20% 12¢	—13.5%	27½%	
555 Wool clothing.....	25%		27½%	
558b,d,b. Synthetic yarns of various types....				14-24%
561 Synthetic fabrics..... and per lb.....	22½%		25% 30¢	—38.5%
567a Synthetic textile clothing.....	20%		27½%	
568 Knitted goods n.o.p.....	20%		35%	
572 Wool carpets..... and per sq.ft.....	25%		25% 5¢	35-40%
573 Linoleum, oil cloth, etc.....	15%		27½%	
611a (1) and (2) Boots and shoes.....	20%		27½%	
617 Rubber boots and shoes.....	Free		22½%	
618 Manufactures of rubber.....	15%		20%	
618b (2) Tires and tubes.....	20%		22½%	

Table 31 (concluded)

Tariff Item		BP	Ad valorem equivalent	MFN	Ad valorem equivalent
619a	Rubber clothing.....	22½%		27½%	
624a	Dolls and toys.....	5-10%		25-30%	
647	Jewellery.....	20%		30%	
653	Brushes.....	15%		25%	
703b	Tourist exemption, \$100.00, once every four months.....	Free		Free	
711	All goods not enumerated.....	15%		20%	
848	All apparatus for oil development..	Free		Free	
901	Synthetic resins.....	Free-7½%		Free-7½%	
908	Manufactures of synthetic resins...	15%		20%	
Prohibited goods					
1204	Oleomargarine				
1215	Used or second-hand automobiles				

Table 32

IMPORTS OF SECONDARY MANUFACTURING PRODUCTS BY INDUSTRY, 1929, 1937, 1953

(millions of current dollars)

Industry	1929	Percent of total	1937	Percent of total	1953	Percent of total
	(\$ million)	%	(\$ million)	%	(\$ million)	%
Alcoholic beverages.....	47	6	8	2	20	1
Tobacco products.....	1	neg.	1	neg.	2	neg.
Rubber products.....	4	1	3	neg.	24	1
Leather products.....	12	2	6	1	19	1
Cotton textiles and clothing.....	34	4	20	5	90	3
Wool " ".....	40	5	19	5	73	2
Silk " ".....	34	4	7	2	53	2
Other " ".....	26	3	19	5	53	2
Secondary paper products.....	15	2	8	2	38	1
Books and printed matter.....	18	2	14	3	68	2
Primary iron and steel.....	73	10	49	12	143	5
Agricultural implements.....	32	4	17	4	209	7
Machinery other than agricultural...	70	9	46	11	402	14
Engines, locomotives and boilers....	18	2	11	3	117	4
Other iron and steel products.....	60	8	33	8	309	11
Motor vehicles and parts.....	85	11	49	12	324	11
Aircraft and parts.....	2	neg.	1	neg.	112	4
Electrical apparatus and supplies....	39	5	17	4	254	9
Glass.....	11	1	9	2	37	1
Petroleum products.....	28	4	12	3	144	5
Coal products.....	7	1	4	1	17	neg.
Medicinal and pharmaceutical preparations.....	4	1	4	1	22	1
Paints, pigments and varnishes.....	6	1	5	1	21	1
Other secondary chemicals.....	17	2	12	3	65	2
Scientific and educational equipment	5	1	4	1	26	1
Other.....	66-86	11	32-47	9	232-332	10
Total secondary.....	745-765	100	410-425	100	2875-2975	100

NOTE: Percentages are based on the mid-point of the range shown for the total and will not necessarily add to 100 because of rounding.

Table 33

IMPORTS OF PRODUCTS OF SELECTED SECONDARY
MANUFACTURING INDUSTRIES BY SOURCE*(millions of current dollars)*

	1929			1937			1953		
	U.K.	U.S.	Other	U.K.	U.S.	Other	U.K.	U.S.	Other
	\$	\$	\$	\$	\$	\$	\$	\$	\$
Alcoholic beverages.....	38.6	—	8.0	5.9	.1	2.1	10.3	2.9	7.1
Rubber products.....	.5	2.8	.3	.4	2.1	.3	1.6	21.1	1.5
Cotton clothing and textiles..	12.6	17.7	3.6	12.5	4.5	2.8	16.0	64.8	9.6
Wool clothing and textiles...	31.1	2.0	7.3	18.0	.4	.9	59.2	3.3	10.3
Paper products.....	1.6	11.6	1.5	1.4	5.6	1.0	1.3	37.0	.9
Books and printed matter....	2.6	14.8	.7	2.3	11.6	.6	2.8	63.1	2.5
Agricultural implements.....	.2	31.3	.3	.5	16.3	.4	5.4	202.8	.9
Non-agricultural machinery..	4.4	63.3	1.9	3.8	41.3	1.3	46.8	339.1	16.0
Engines, locomotives and boilers.....	1.4	16.3	.1	1.2	9.6	.3	19.5	96.6	.6
Primary iron and steel.....	9.3	59.9	4.2	17.4	29.9	1.8	19.2	112.9	10.7
Other iron and steel products.	6.5	50.4	3.1	5.5	25.4	2.2	35.6	261.2	12.4
Motor vehicles and parts....	.5	84.3	.1	1.4	48.0	—	35.0	286.4	2.2
Aircraft and parts.....	.7	1.6	.1	—	1.0	.4	7.6	104.0	.2
Electrical apparatus and supplies.....	2.2	35.9	.7	2.0	12.7	1.9	23.3	227.0	3.5
Petroleum products.....	.3	27.5	—	.1	10.0	1.3	.1	124.2	19.6
Glass products.....	1.3	5.2	4.1	1.7	4.1	2.7	5.2	26.4	5.8
Drugs and pharmaceutical products.....	1.0	2.0	.7	.8	2.0	.7	1.8	19.1	1.5
Paints, pigments and varnishes	1.0	4.4	.8	1.9	2.7	.4	4.2	16.9	.1
Scientific and educational equipment.....	.3	4.1	.7	.6	3.0	.7	1.8	21.5	6.4

SOURCE: *Canada's Imports.*

Table 34

IMPORT SHARE OF THE DOMESTIC MARKET FOR
SELECTED SECONDARY MANUFACTURING PRODUCTS

Product	Unit	1929	1937	1953
		%	%	%
Bakery products.....	Value	.8	.7	1.1
Breweries.....	"	.9	.5	.2
Distilled liquors.....	"	71.3	64.2	21.8
Wines.....	"	38.6	21.2	26.0
Tobacco products.....	"	1.3	.9	1.1
Leather products.....	"	12.8	7.4	8.0
Footwear.....	"	5.8	2.4	5.2
Rubber products.....	"	5.2	4.7	7.9
Footwear.....	"	.5	.9	3.5
Tires and tubes.....	"	1.4	1.5	4.2
Other.....	"	13.2	14.2	14.5
Textiles and clothing.....	lbs.	34.6	18.8	27.6
Cotton products.....	lbs.	26.5	18.0	31.9
Wool products.....	lbs.	52.2	24.1	33.5
Synthetic products.....	lbs.	46.8	11.4	14.6
Carpets and rugs.....	000 Sq. ft.	37.1	11.7 ^a	56.0
Blankets (wool and part wool).....	000	n.a.	13.5 ^b	12.1
Furniture.....	value	7.0	2.9	2.0

Table 34 (concluded)

Product	Unit	1929	1937	1953
		%	%	%
Secondary paper products.....	"	9.8	5.0	4.0
Books, writing and groundwood papers.....	tons	12.7	4.6 ^a	4.4
Wrapping paper.....	tons	5.7 ^c	2.4 ^a	.3
Agricultural implements.....	value	65.8	54.0	68.3
Industrial machinery.....	"	61.2	56.7	58.2 ^d
Construction machinery.....	"	71.1	69.0	74.3 ^d
Mining and oil-well machinery.....	"	81.3	59.7	90.5 ^d
Printing and publishing machinery.....	"	58.2	57.1	97.9 ^d
Metal working machinery.....	value	77.6	84.8	76.4 ^d
Compressors.....	"	47.1	35.0	38.2 ^d
Pulp and paper machinery.....	"	19.4	11.8	18.8 ^d
Primary iron and steel.....	value	52.8	41.2	26.1
Billets.....	tons	—	—	1.9
Structurals.....	tons	—	—	51.7
Plates and skelp.....	tons	—	—	37.3
Rails.....	tons	—	—	3.2
Track material.....	tons	—	—	9.7
Bars and rods.....	tons	—	—	9.3
Hot rolled sheet strip.....	tons	—	—	51.3
Cold rolled sheet strip.....	tons	—	—	26.0
Other sheet strip.....	tons	—	—	9.2
Motor vehicles and parts.....	value	34.2	23.8	23.0
Automobiles.....	"	22.2	13.6	13.8
Trucks.....	"	19.0	8.0	4.7
Parts.....	"	65.7	48.1	46.2
Railway rolling stock.....	"	3.2	2.7	7.5
Bicycles and parts.....	"	11.6	12.9	27.7
Electrical apparatus and supplies.....	"	25.5	14.8	24.9
Large electrical appliances.....	"	27.2	17.8	36.1
Stoves.....	"	15.7	20.0	28.3
Refrigerators.....	"	64.6	18.6	44.0
Washing machines.....	"	15.9	15.0	16.6
Heavy electrical apparatus.....	"	31.7	23.4	28.1
Industrial controls.....	"	50.5	34.1	42.2
Motors and parts.....	"	40.7	23.7	24.5
Transformers and parts.....	"	7.8	4.4	7.9
Small electrical appliances.....	value	31.0	8.5	25.8
Miscellaneous electrical apparatus.....	"	14.1	9.0	12.2
Wire and cable.....	"	5.4	2.4	3.0
Lighting fixtures.....	"	44.8	29.4	19.1
Batteries.....	"	5.2	3.3	7.4
Radio and electronic equipment.....	value	40.8	17.2	29.2
Radios.....	sets	35.6	2.7	3.2
Glass products.....	value	43.4	28.6	46.2
Petroleum products.....	"	22.0	10.5	17.2
Medicinal and pharmaceutical preparations.....	"	20.3	16.8	25.0
Paints, varnishes and lacquers.....	"	18.9	16.9	16.2

a 1935-39 average.

b 1939

c 1928

d 1952

SOURCE: *Canada's Imports*, various industry studies published by the Commission, Trade of Canada, and Census of Industry.

Table 35

EARNINGS AND HOURS OF WORK IN MANUFACTURING, CANADA AND THE UNITED STATES, 1939-55

Year	Average hourly earnings				Average hours per week			
	U.S.	Canada	Differential		U.S.	Canada		
	Cents per hour		Cents	% C/A	Year's Average	Pay-day nearest to Oct. 15	Year's Average	Last Week in Oct. or November
	A	B	C	D	A	B	C	D
1939.....	64.6	42.2	22.4	34.7	37.7	39.1	—	47.2
1940.....	67.3	44.4	22.9	34.0	38.1	39.3	—	50.1
1941.....	77.0	48.9	28.1	36.5	40.6	41.1	—	50.5
1942.....	89.3	55.7	33.6	37.6	42.9	43.6	—	50.2
1943.....	98.8	60.6	38.2	38.7	44.9	45.4	—	48.8
1944.....	103.1	64.7	38.4	37.2	45.2	45.6	—	47.5
1945.....	98.5	66.4	32.1	32.6	43.4	41.6	44.3	46.3
1946.....	113.0	74.1	38.9	34.4	40.4	40.5	42.7	43.7
1947.....	125.8	85.1	40.7	32.4	40.4	40.6	42.5	43.7
1948.....	136.6	94.6	42.0	30.7	40.1	40.0	42.2	43.6
1949.....	139.2	98.4	40.8	29.3	39.2	39.7	42.3	43.3
1950.....	150.1	105.6	44.5	29.6	40.5	41.3	42.3	43.5
1951.....	161.5	122.2	39.3	34.3	40.7	40.5	41.8	42.0
1952.....	170.5	129.5	41.0	24.0	40.7	41.4	41.5	42.6
1953.....	178.0	135.9	42.1	23.7	40.5	40.3	41.3	41.7
1954.....	181.0	139.8	41.2	22.8	39.7	39.9	40.6	41.3
1955.....	191.0	144.8	46.2	24.2	40.7	41.1	41.0	41.5

For explanatory comments see notes which follow Table 38.

SOURCE: Compiled by the Department of Labour, Ottawa.

Table 36

AVERAGE HOURLY EARNINGS IN SELECTED SECONDARY MANUFACTURING INDUSTRIES, PRIMARY IRON AND STEEL

Year	Average hourly earnings ^a			
	U.S. ^b	Canada ^c	Differential	
	cents per hour		cents	% C/A
	A	B	C	D
1939.....	0.84	0.56 ^d	.28	33.3
1946.....	1.28	0.83	.45	35.2
1947.....	1.44	0.96	.48	33.3
1948.....	1.58	1.08	.50	31.6
1949.....	1.65	1.18	.47	28.5
1950.....	1.69	1.27	.42	24.9
1951.....	1.89	1.41	.48	25.4
1952.....	1.99	1.58	.41	20.6
1953.....	2.16	1.70	.46	21.3
1954.....	2.20	1.71	.49	22.3
1955.....	2.45	1.86	.59	24.1

a As at beginning of each month.

b Blast furnaces, steel works and rolling mills.

c Primary iron and steel.

d Figure for male employees only during one week in the month of highest employment in 1939.

SOURCE: *The Canadian Primary Iron and Steel Industry*, p. 77.

Table 37

AVERAGE HOURLY EARNINGS IN SELECTED SECONDARY MANUFACTURING INDUSTRIES
MOTOR VEHICLES, ELECTRICAL APPARATUS AND SUPPLIES, CHEMICAL PRODUCTS

Year	Motor vehicles				Electrical apparatus and supplies				Chemical products			
	U.S.		Canada		U.S.		Canada		U.S.		Canada	
	cents	per hour	cents	per hour	cents	per hour	cents	per hour	cents	per hour	cents	per hour
	A	B	C	D	A	B	C	D	A	B	C	D
1939	92.2	76.2	16.0	17.4	73.3	46.8	26.5	36.2	78.9	44.8	34.1	43.2
1940	95.1	85.6	9.5	10.0	75.2	44.3	30.9	41.1	79.8	45.6	34.2	42.9
1941	109.1	89.4	19.7	18.1	86.0	51.8	34.2	39.8	88.6	51.2	37.4	42.2
1942	117.2	95.1	22.1	18.9	93.6	54.8	38.8	41.5	86.6	54.7	31.9	36.8
1943	125.0	98.0	27.0	21.6	98.6	60.5	38.1	38.6	93.1	57.5	35.6	38.2
1944	127.0	118.0	9.0	7.1	104.6	63.7	40.9	39.1	95.7	63.8	31.9	33.3
1945	121.9	106.1	15.8	13.0	103.1	68.2	34.9	33.9	99.1	64.2	34.9	35.2
1946	137.6	109.3	28.3	20.6	118.6	77.3	41.3	34.8	110.2	73.1	37.1	33.7
1947	152.6	121.5	31.1	20.4	133.1	91.8	41.3	31.0	127.3	84.8	42.5	33.4
1948	168.9	130.6	38.3	22.7	144.8	105.4	39.4	27.2	139.0	93.3	45.7	32.9
1949	168.9	132.1	36.8	21.8	143.5	109.5	34.0	23.7	142.7	97.7	45.0	31.5
1950	183.0	145.5	37.5	20.5	152.3	117.7	34.6	22.7	153.7	107.2	46.5	30.3
1951	194.8	149.3	45.5	23.4	164.5	135.0	29.5	17.9	163.1	123.6	39.5	24.2
1952	214.1	166.2	47.9	22.4	173.0	140.8	32.2	18.6	171.7	133.7	38.0	22.1
1953	216.0	168.5	47.5	22.0	177.0	145.1	31.9	18.0	184.0	138.9	45.1	24.5
1954	223.0	176.0	47.0	21.1	183.0	148.3	34.7	19.0	191.0	145.5	45.5	23.8
1955	235.0	183.6	51.4	21.9	191.0	150.6	40.4	21.2	201.0	153.2	47.8	23.8

Table 38

AVERAGE HOURLY EARNINGS IN SELECTED SECONDARY MANUFACTURING INDUSTRIES
TEXTILES, PULP AND PAPER, AGRICULTURAL IMPLEMENTS

Year	Textiles				Pulp and Paper				Agricultural Implements			
	U.S.		Canada		U.S.		Canada		U.S.		Canada	
	cents per hour	Differential %	cents per hour	Differential %	cents per hour	Differential %	cents per hour	Differential %	cents per hour	Differential %	cents per hour	Differential %
	A	C/A	B	C	A	C/A	B	C	A	C/A	B	C
1939.....	48.6	28.0	35.0	13.6	62.9	57.7	52.2	8.3	78.2	55.7	22.5	28.8
1940.....	50.9	29.3	36.0	14.9	65.4	57.6	7.8	11.9	80.2	50.7	29.5	36.8
1941.....	58.1	32.7	39.1	19.0	73.2	62.6	10.6	14.5	92.3	47.2	45.1	48.9
1942.....	63.9	34.6	41.8	22.1	82.8	63.3	19.5	23.6	98.0	73.3	24.7	25.2
1943.....	67.4	32.6	45.4	22.0	86.0	66.5	19.5	22.7	108.8	71.3	37.5	34.5
1944.....	72.3	32.4	48.9	23.4	90.1	70.1	20.0	22.2	112.8	77.0	35.8	31.7
1945.....	77.3	34.2	50.9	26.4	93.1	72.6	20.5	22.0	109.4	76.5	32.9	30.1
1946.....	94.8	39.7	55.1	38.3	110.2	85.0	25.2	22.9	124.5	88.1	36.4	29.2
1947.....	105.5	41.9	67.2	36.3	128.7	101.0	27.7	21.5	143.9	98.9	45.0	31.3
1948.....	118.7	41.9	76.8	35.3	140.9	112.6	28.3	20.1	153.4	113.7	39.7	25.9
1949.....	119.4	30.7	82.8	36.6	142.1	114.0	28.1	19.8	155.4	114.9	40.5	26.1
1950.....	129.5	32.0	88.1	41.4	151.0	121.7	29.3	19.4	164.1	131.5	32.6	19.9
1951.....	132.5	25.3	99.0	33.5	161.7	147.5	14.2	8.8	182.3	134.2	28.1	15.4
1952.....	136.0	22.8	105.0	31.0	172.9	152.1	20.8	12.0	185.4	157.9	27.5	14.8
1953.....	137.0	21.5	107.6	29.4	182.0	165.1	16.9	9.3	192.0	160.3	31.7	16.5
1954.....	136.0	18.8	110.4	25.6	188.0	173.4	14.6	7.8	199.0	163.5	35.5	17.8
1955.....	141.0	20.5	112.1	28.9	198.0	180.7	17.3	8.7	213.0	166.2	46.8	22.0

Notes to Tables 35-38

The figures shown in Tables 35-38 have necessarily been assembled from a variety of sources, because all the information desired was not available in wholly consecutive series. The results are therefore not strictly comparable with one another, but may be of value as showing approximate trends. Both United States and Canadian earnings figures are expressed in terms of domestic currency.

*Earnings**Column A*

1939-55. United States Bureau of Labour Statistics: *Hours and Gross Earnings of Production Workers or Non-Supervisory Employees*. These figures are based on monthly surveys. Those shown here relate to the pay period nearest to October 15 in each year.

N.B. Although apparently these figures are nearly homogeneous, there are slight differences over the years in the basis on which they were prepared. The series from 1939 to 1942 was entitled *Employment, Pay-Rolls, Hours and Earnings in Manufacturing and Non-Manufacturing*. From 1943 to 1948, it was named *Hours and Earnings in Manufacturing and Non-Manufacturing Industries*. The present series began in 1949.

Column B

1939-45. Dominion Bureau of Statistics: *General Review of the Manufacturing Industries of Canada*. Data are drawn from annual surveys covering all establishments in Canada (non-executives). The figures relate to one week in the month of highest employment in each year. This month is reported to have fallen in most cases around the end of the third quarter, or the beginning of the fourth.

N.B. Owing to the period each year to which these figures relate (i.e. month of highest employment), there can be only a rough comparison with the United States data available, which as shown under Column A above, apply to the same month in every year. For this reason, other D.B.S. series which are more truly comparable have been used from their first date of issue as shown below.

1946-54. Dominion Bureau of Statistics: *Earnings and Hours of Work in Manufacturing*. These figures, which are based on an annual survey covering establishments with 15 or more employees (non-executives), apply to the last week in October in certain years or the last week in November. The proportion covered of all employees in manufacturing is stated by the D.B.S. to be fairly high, e.g., in the first year (1946), the employees of co-operating

establishments amounted to over 86% of the total of workers reported in the *General Review of Manufacturing Industries*.

N.B. The reason for using this series is that the *Earnings and Hours of Work in Manufacturing* data appear to be the most closely comparable with the United States material available.

1955. Dominion Bureau of Statistics: *Man-Hours and Hourly Earnings*. This series is based on monthly questionnaires to firms with 15 employees or over, and covers hourly-rated wage-earners. The figure in this column relates to the second half of October.

Hours of Work

Columns A and B

Bureau of Labour Statistics: *Hours and Gross Earnings of Production Workers or Non-Supervisory Employees*. These two columns show the averages respectively for each year, and for the pay-period nearest to October 15 in each year.

Column C

Dominion Bureau of Statistics: *Man-Hours and Hourly Earnings*. Average for each year. Available from 1945 only.

Column D

1939-45. Dominion Bureau of Statistics: *General Review of the Manufacturing Industries*. These figures apply to the month of highest employment, as above.

1946-54. Dominion Bureau of Statistics: *Earnings and Hours of Work in Manufacturing* last week in October or November each year.

1955. Dominion Bureau of Statistics: *Man-Hours and Hourly Earnings* second half of October.

Coverage of Industrial Groupings

In some cases, industrial groupings could be found in the United States statistics which appear to correspond very closely with the Canadian groupings selected. In some of the tables, however, the United States figures available cover a slightly different industrial composition. In both countries, some of the groupings vary at various times even within each series.

Accordingly, a selection had to be made of the groupings which seemed to give the best basis for comparability. The title of each table is the one preponderant in the Canadian statistics.

The following particular points are worth noting:

Textiles: Canadian hourly figures refer in the main to primary textiles. In Column B, however, the only data available before 1946 and for the year 1947 cover *all* textiles. All the United States material—basically covering primary textiles—includes certain classes (e.g. knitted goods, hats, caps, etc.) which do not apply to the Canadian figures (except as above).

Chemical Products: Canadian hourly figures in column B for 1940 and 1941 relate to "Chemicals" only. The remainder of column B refers to "Chemical products". Most of the United States figures apply to "Chemicals and allied products", but some are restricted to "Chemicals".

Primary iron and steel: For satisfactory comparability with the Canadian figures, it was felt best to use "Blast furnaces, steel works and rolling mills".

Agricultural implements: The Canadian grouping includes "Tractors". In the United States figures, "Tractors" are included in 1939, 1941 and 1949-55. In other years, the United States data specifically *exclude* "Tractors".

Electrical apparatus and supplies: The United States material covers only "Electrical machinery", except in 1940 and 1941, when it includes "Electrical machinery, apparatus and supplies".

Table 39

**INDICES OF SEASONAL ACTIVITY —
CONSTRUCTION EMPLOYMENT AND PRODUCTION OF CERTAIN BUILDING MATERIALS
CANADA AND THE UNITED STATES, 1955-56**

		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<i>Employment in construction</i>													
Canada	1955 (average = 100) ...	90.7	79.3	75.7	76.8	86.3	100.3	109.5	115.1	120.9	120.3	116.6	109.0
United States	1955 (average = 100) ...	89.3	86.6	90.0	95.7	100.8	104.3	107.8	109.6	109.7	107.1	103.0	96.0
Canada	1956 (average = 100) ...	80.4	78.7	77.9	77.5	87.9	101.8	115.8	119.5	119.7	116.4	115.4	109.0
United States	1956 (average = 100) ...	85.2	85.2	87.9	93.9	100.1	107.2	107.6	110.4	109.9	108.7	105.1	98.7
<i>Production Brick</i>													
Canada	1955 (average = 100) ...	59.2	58.2	77.1	70.5	116.1	133.2	120.7	130.5	124.4	121.9	113.6	75.6
United States	1955 (average = 100) ...	78.9	74.8	94.4	95.6	103.1	109.8	104.6	113.7	113.5	110.3	106.2	95.2
Canada	a) 1956 (average = 100) ...	64.6	81.4	74.4	81.6	110.4	118.4	118.4	120.2	108.4	122.2	96.2	80.6
United States	1956 (average = 100) ...	92.7	87.9	100.2	102.9	110.1	106.0	106.2	112.3	99.0	106.0		
<i>Paints</i>													
Canada	1955 (average = 100) ...	75.2	78.6	95.2	114.2	132.7	133.4	106.0	102.9	102.4	99.6	88.8	71.1
United States	1955 (average = 100) ...	86.9	82.3	105.5	106.9	113.4	118.4	98.6	108.9	105.5	99.1	94.1	80.1
Canada	1956 (average = 100) ...	82.6	87.1	97.9	122.5	128.7	122.4	105.8	106.9	92.7	97.9	90.1	65.4
United States	1956 (average = 100) ...	98.2	92.9	99.8	103.4	111.5	110.9	101.6	111.5	97.5	106.5	92.3	73.9
<i>Gypsum lath</i>													
Canada	1955 (average = 100) ...	67.9	72.0	62.8	71.4	88.0	112.9	131.9	129.8	133.3	126.2	119.7	84.2
United States	1955 (average = 100) ...			93.4			99.0			105.4		102.2	
Canada	1956 (average = 100) ...	95.3	114.8	118.7	111.9	107.7	119.7	101.8	91.4	94.3	93.0	88.5	62.8
United States	1956 (average = 100) ...			101.9			112.9			85.2			

a Average for 10 months.

b Average for 9 months.

SOURCES: Canadian Statistical Review. Survey of Current Business.

Table 40

INDICES OF SEASONALITY IN MANUFACTURING EMPLOYMENT CANADA AND THE UNITED STATES, 1955-56

	January	February	March	April	May	June	July	August	September	October	November	December
Total manufacturing												
Canada — 1955..	94.5	94.8	96.7	97.5	98.2	100.0	102.1	102.0	104.3	103.8	103.2	102.8
United States — 1955..	95.9	96.9	97.9	98.2	98.6	100.2	99.2	101.5	102.4	103.0	103.4	103.1
Canada — 1956..	95.2	95.5	97.4	98.3	98.9	100.0	102.3	102.2	102.3	102.8	102.7	102.3
United States — 1956..	100.7	100.3	99.7	99.5	99.0	99.3	95.0	100.6	101.3	102.1	101.5	101.2
Durable manufacturing												
Canada — 1955..	93.2	93.9	97.2	98.6	99.5	101.4	102.8	102.5	103.1	102.5	102.6	102.8
United States — 1955..	95.1	96.4	97.7	98.8	99.7	101.1	99.3	100.0	100.9	102.4	103.8	104.0
Canada — 1956..	94.2	94.2	97.6	99.2	100.1	101.8	103.0	102.3	100.7	101.3	102.7	102.8
United States — 1956..	101.6	100.8	99.9	100.5	99.7	99.6	92.8	98.8	99.3	101.6	102.4	102.4
Non-durable manufacturing												
Canada — 1955..	95.7	95.8	96.3	96.5	97.0	98.7	101.5	101.4	105.5	105.0	103.9	102.8
United States — 1955..	96.7	97.3	97.8	97.1	96.9	98.9	98.7	103.4	104.2	103.6	102.5	101.6
Canada — 1956..	96.2	97.0	97.2	97.4	97.8	98.4	101.7	102.2	104.1	103.4	102.9	101.7
United States — 1956..	99.5	99.6	99.3	98.2	97.8	98.9	98.0	102.9	103.8	102.7	100.4	99.6
Textile products												
Canada — 1955..	94.7	95.4	98.4	99.1	99.5	100.2	101.0	100.0	101.1	103.1	103.7	103.9
United States — 1955..	99.5	100.3	100.3	100.1	98.3	99.2	97.1	100.4	100.7	100.9	101.6	101.8
Canada — 1956..	100.7	101.6	101.7	101.4	100.2	92.4	101.3	99.8	99.7	99.2	100.5	101.6
United States — 1956..	103.2	103.0	102.2	101.1	100.3	100.0	96.0	99.0	98.9	99.2	98.7	98.5
Clothing												
Canada — 1955..	94.4	98.5	101.0	100.9	99.0	98.2	98.0	96.4	101.8	104.2	104.2	103.4
United States — 1955..	98.3	101.3	102.1	97.2	95.8	97.3	94.3	101.3	102.6	103.3	103.0	103.2
Canada — 1956..	97.4	101.3	103.0	102.6	100.9	99.4	98.6	96.5	99.7	100.6	100.8	99.4
United States — 1956..	102.2	104.6	103.2	98.8	97.0	97.0	94.4	100.1	99.8	100.9	100.8	100.7

Table 40 (continued)

	January	February	March	April	May	June	July	August	September	October	November	December
Electrical apparatus												
Canada — 1955..	96.6	97.0	97.2	96.7	96.1	97.6	99.0	98.2	102.9	106.5	105.9	106.5
United States — 1955..	96.7	97.1	97.1	97.2	97.8	98.7	97.0	98.9	103.4	107.0	104.7	105.0
Canada — 1956..	95.3	94.5	96.4	98.0	98.6	99.8	101.0	100.3	102.9	103.3	105.2	104.6
United States — 1956..	97.4	96.8	96.0	99.7	99.4	98.7	97.4	100.1	101.6	104.2	104.9	104.1
Chemical Products												
Canada — 1955..	98.1	98.0	98.4	98.5	99.3	100.4	99.5	99.7	102.3	101.7	101.8	102.2
United States — 1955..	97.6	97.8	100.2	100.7	100.5	99.6	99.1	99.3	101.1	101.8	101.5	101.6
Canada — 1956..	96.5	97.4	97.4	98.3	99.4	101.2	101.9	101.3	101.8	102.1	101.3	101.4
United States — 1956..	100.2	100.5	102.0	102.5	100.7	99.5	98.0	98.9	99.6	99.8	99.6	98.5

NOTES: Monthly figures are indices based on an average for the year equalling 100.0.

Canadian figures are based on data in Table 9, *Canadian Statistical Review*.

United States figures are based on table in *Survey of Current Business* and relate to production workers only.

In the Textile products, Clothing, and Electrical apparatus groups we have used the United States classifications of Textile mill products, Apparel etc., and Electrical machinery respectively.

Table 41

CLASSIFICATION OF SELECTED AREAS OF CANADIAN
ECONOMY BY EXTENT OF NON-RESIDENT AND UNITED
STATES OWNERSHIP AND CONTROL, END OF 1954

	<i>Percentage of Capital Employed</i>			
	Controlled by		Owned by	
	All non-residents	United States residents	All non-residents	United States residents
Automobiles and parts	95	95	78	78
Rubber	93	84	78	70
Electrical apparatus	78	n.a.	70	62
Chemicals	75	51	64	44
Petroleum industry	70	68	61	59
Other mining n.o.p.	57	54	60	56
Pulp and paper	56	45	51	42
Smelting and refining of non-ferrous native ores	55	55	59	44
All other manufacturing	51	43	46	37
Insurance, life and other	43	32	62	n.a.
Transportation equipment n.o.p.	36	21	34	19
Agricultural machinery	33	n.a.	35	34
Beverages	20	14	29	25
Textiles	18	10	21	12
Other utilities	11	10	16	14
Primary iron and steel	6	6	16	14
Railways	2	2	35	16
Chartered and savings banks	2	—	26	6

NOTE: Abstracted from *Canada-United States Economic Relations*. We have not attempted to split primary and secondary manufacturing in this and the succeeding table even where it is possible to do so.

Table 42

SELLING VALUE OF FACTORY SHIPMENTS BY SELECTED
UNITED STATES CONTROLLED MANUFACTURING
ESTABLISHMENTS AS PERCENTAGES OF TOTAL, 1953^a

	%
Motor vehicles	98
Rubber products	78
Non-ferrous metal smelting and refining	70
Petroleum products	68
Motor vehicle parts	67
Machinery, household, office and store	60
Non-ferrous metal products n.o.p.	50
Electrical apparatus and supplies	50
Paints, varnishes and lacquers	45
Soaps, washing compounds and cleaning preparations	45
Medicinal and pharmaceutical preparations	41
Sheet metal products	39
Pulp and paper	39
Chemicals and allied products n.o.p.	36
Machinery, industrial and machine tools	32
Grain mill products	29
Heating and cooking apparatus	29
Paper products n.o.p.	29
Brass and copper products	27
Toilet preparations	27
Canning and processing	24
Hardware, tools and cutlery	23
Miscellaneous manufactures	20
Agricultural implements	20
Aircraft and parts, railway rolling stock and transportation equipment n.o.p.	19
Non-metallic mineral products of petroleum and coke, n.o.p.	18
Dairy products	16
Castings, iron	15
Food industries, tobacco and tobacco products and leather products n.o.p.	14
Textile products (except clothing)	14
Iron and steel products n.o.p.	14
Beverages	12
Bakery products and confectionery	10
Primary iron and steel	7
Wood products	6
Clothing (textiles and furs)	2
Printing, publishing, and allied industries	1

^a This table covers all manufacturing establishments of United States-controlled enterprises with an aggregate investment of one million dollars or more in 1953.

NOTE: Abstracted from *Canada-United States Economic Relations*.

Table 43

**PERCENTAGE PROFIT MARGIN ON SALES OF CANADIAN SECONDARY AND
TOTAL MANUFACTURING, AND TOTAL AMERICAN MANUFACTURING, 1953**

Major Industry Groups	Profit and loss companies	Gross sales or revenues	Current Year		Net profit	Percentage margin on sales %
			Profit (thousands of dollars)	Loss and Taxes		
Foods and beverages (secondary).....	756	1,225,555	142,250	68,182	74,068	6.0
Tobacco and products.....	26	173,490	26,965	11,578	15,387	8.9
Rubber products.....	51	297,465	23,767	11,422	12,345	4.2
Leather products.....	391	224,802	8,126	4,834	3,292	1.5
Textile products (except clothing).....	519	643,466	33,393	23,206	10,187	1.6
Clothing (textile and fur).....	1,747	745,915	20,523	13,430	7,093	1.0
Wood products (secondary).....	697	293,325	17,806	8,629	9,177	3.1
Paper products (secondary).....	250	331,788	27,944	13,315	14,629	4.4
Printing, publishing, etc.....	1,189	488,041	47,282	22,269	25,013	5.1
Iron and steel products.....	1,815	2,544,370	215,010	105,556	109,454	4.3
Transportation equipment.....	353	1,984,891	148,701	72,295	76,406	3.8
Non-ferrous metal products (secondary).....	382	307,822	20,572	9,889	10,683	3.5
Electrical apparatus and supplies.....	324	1,105,245	87,239	41,617	45,622	4.1
Non-metallic mineral products (secondary) ^a	268	226,148	25,420	12,621	12,799	5.7
Products of petroleum and coal.....	56	1,334,207	106,702	50,903	55,799	4.2
Chemical and allied products (secondary).....	728	590,133	53,912	28,752	25,160	4.3
Miscellaneous manufacturing industries.....	624	255,838	18,917	9,834	9,083	3.6
Secondary total.....	10,176	12,772,501	1,024,529	508,332	516,197	4.0
Primary total.....	2,058	4,918,004	420,613	208,049	212,564	4.3
Manufacturing total.....	12,234	17,690,505	1,445,142	716,381	728,761	4.1
American total manufacturing (sample).....	1,781	—	—	—	—	(5.3)

^a Asbestos and clay products are classified in primary manufacturing.

SOURCE: Canadian data from *Taxation Statistics 1955* Dept. of National Revenue.

American data from sample contained in *National City Monthly Letter* April 1954.

Sales include income from investments and other sources.

Table 44

**PERCENTAGE MARGIN ON SALES FOR SELECTED CANADIAN AND AMERICAN SECONDARY
MANUFACTURING INDUSTRIES, 1953**

	Profit and loss companies	Gross sales or revenue	Canada current year		Net profit	Canadian percentage margin on sales %	United States American percentage margin on sales %	No. of American firms reporting
			Profit (<i>thousands of dollars</i>)	Loss and taxes				
Bakery products.....	229	267,971	11,461	5,294	6,167	2.3	3.5	21
Beverages.....	277	512,801	95,689	45,831	49,858	9.7	n.a.	—
Tobacco products.....	26	173,490	26,965	11,578	15,387	8.9	3.9	23
Rubber products.....	51	297,465	23,767	11,422	12,345	4.2	4.2	27
Leather products.....	391	224,802	8,126	4,834	3,292	1.5	3.2	29
Clothing.....	519	643,466	33,393	23,206	10,187	1.6	2.7	35
Textiles.....	1,747	745,915	20,523	13,430	7,093	1.0	n.a.	—
Furniture.....	423	187,729	11,083	5,191	5,892	3.1	3.8	16
Printing, publishing, etc.....	1,189	488,041	47,282	22,269	25,013	5.1	3.1	34
Agricultural implements.....	52	330,336	19,014	9,858	9,156	2.8	4.2	12
Industrial machinery.....	734	438,824	40,289	19,118	21,171	4.8	4.8	176
Primary iron and steel.....	44	495,284	41,981	20,058	21,923	4.4	5.7	51
Motor vehicles and parts.....	156	1,201,185	99,523	48,819	50,704	4.2	n.a.	—
Shipbuilding.....	119	172,495	14,887	6,965	7,922	4.6	3.4	8
Aircraft and parts.....	44	403,630	16,810	7,957	8,853	2.2	2.4	37
Secondary non-ferrous metals.....	382	307,822	20,572	9,889	10,683	3.5	n.a.	—
Electrical apparatus.....	324	1,105,245	87,239	41,617	45,622	4.1	4.3	82
Petroleum and coal products.....	56	1,334,207	106,702	50,903	55,799	4.2	10.6	95
Chemical products.....	728	590,133	53,912	28,752	25,160	4.3	7.6	65
Total secondary.....	10,176	12,772,501	1,024,529	508,332	516,197	4.0	n.a.	—

See Table 43 for notes and sources.

Table 45

PERCENTAGE RETURN ON NET ASSETS,
SELECTED GROUPS OF CANADIAN AND AMERICAN
SECONDARY MANUFACTURING INDUSTRIES, 1953

	Canada	United States
Food products	9.9	9.4
Beverages	14.1	8.7
Textiles	3.5	5.8
Iron and steel products	12.1	11.6
Electrical apparatus	15.7	15.1
Chemicals	12.7	13.3
Machinery (except electrical)	11.8	13.6
All manufacturing	9.9	12.5

SOURCE: See Table 43. Figures are based on published book value of net assets shown in the source material.

Table 46

COMPARISON OF CANADIAN (ADJUSTED) AND UNITED STATES VALUE-ADDED PER MAN-HOUR IN SECONDARY MANUFACTURING AND SELECTED INDUSTRIES, 1953

	Canadian value-added per man-hour	With value-added adjustment of 10%	Price factor %	Adjusted Canadian value-added with price correction	United States value-added per man-hour	Canadian value-added per man-hour (adjusted) as a percentage of American v.-a. per man-hour
Total Secondary Manufacturing	\$ 3.38	\$ 3.04	minus 7.5 to 12.5	\$ 2.74	\$ 4.50	60.9% ^a
Beverages.....	8.31	7.48	plus 5 to 10	8.04	9.19	87.6
Bakery products.....	2.26	2.03	plus 15 to 25	2.44	5.13	47.6
Tobacco products.....	4.40	3.96	minus 10 to 15	3.47	5.96	58.2
Rubber products.....	4.75	4.26	0 to minus 15	3.94	4.68	84.2
Leather products.....	1.73	1.56	0 to minus 10	1.48	2.72	54.4
Textile products.....	2.25	2.03	minus 10 to 15	1.78	2.85	62.5
Clothing.....	2.00	1.80	minus 10	1.62	2.69	60.2
Furniture.....	2.19	1.97	minus 5	1.87	3.25	57.5
Printing, publishing, etc.....	4.31	3.88	nil	3.88	6.40	60.6
Agricultural implements (ex.tractors)	3.56	3.20	nil	3.20	4.70	68.1
Industrial machinery.....	3.82	3.44	minus 15 to 20	2.84	4.92	57.7
Primary iron and steel.....	3.36	3.02	minus 0 to 5	2.94	5.18	56.8
Motor vehicles and parts.....	4.25	3.83	minus 10 to 20	3.26	5.01	65.1
Railway rolling stock.....	2.25	2.03	0 to minus 5	1.98	4.63	42.8
Electrical apparatus and supplies..	3.89	3.50	minus 10 to 15	3.06	4.62	66.2
Petroleum and coal products.....	8.48	7.63	minus 5 to 10	7.06	7.97	88.6
Secondary chemicals.....	6.21	5.59	minus 10 to 15	4.89	9.33	52.4
Residue.....	3.37	3.03	minus 7.5 to 12.5	2.73	4.30	63.5

^a Total for secondary manufacturing is not derived by averaging individual industries—see text of Chapter 7. If industry figures are averaged on a weighted basis, the figure thus derived would be 61.7.

Note: Figures for individual industries are based on arbitrary assumptions about the value-added adjustment, while price adjustments are very rough—see text.

Table 47

CANADIAN UNADJUSTED VALUE-ADDED PER MAN-HOUR,
SELECTED SECONDARY INDUSTRIES, 1953

	Production workers (000's)	Hours per week	Labour input (millions of man-hours)	Value-added (millions of current \$)	Value-added per man-hour \$
Beverages.....	16.6	41.6	36.01	299.2	8.31
Bakery products.....	34.7	44.0	79.61	179.9	2.26
Tobacco products.....	8.2	39.9	17.06	75.0	4.40
Rubber products.....	17.0	41.0	36.34	172.7	4.75
Leather products.....	28.8	40.0	60.07	103.9	1.73
Textile products.....	61.7	41.3	132.86	299.2	2.25
Clothing.....	104.4	38.1	207.39	414.5	2.00
Furniture.....	24.7	43.1	55.51	121.5	2.19
Printing, publishing, etc..	40.7	39.8	84.46	364.4	4.31
Agricultural implements..	11.0	38.8	22.25	79.1	3.56
Industrial machinery....	21.8	42.7	48.54	185.6	3.82
Primary iron and steel...	30.5	40.6	64.56	217.0	3.36
Motor vehicles and parts..	46.3	40.4	97.53	414.9	4.25
Railway rolling stock....	32.9	39.8	68.27	153.7	2.25
Shipbuilding.....	20.1	42.7	44.75	115.5	2.58
Aircraft and parts.....	27.1	43.8	61.89	260.5	4.21
Electrical apparatus and supplies.....	54.8	41.2	117.72	457.5	3.89
Petroleum and coal products.....	11.5	41.6	24.94	211.6	8.48
Secondary chemicals....	23.3	41.8	50.78	315.1	6.21
Residue.....	207.9	42.0	455.25	1,534.5	3.37
Total secondary manufacturing...	824.0	41.1	1,765.79	5,975.3	3.38

NOTE: Labour input is derived by multiplying the number of production workers by the number of hours worked per week for 52.14 weeks per year.

SOURCE: *The Manufacturing Industries of Canada and Review of Man-Hours and Hourly Earnings, 1945-55.*

Table 48

UNITED STATES VALUE-ADDED PER MAN-HOUR FOR
SELECTED SECONDARY MANUFACTURING INDUSTRIES, 1953

	Production workers (000's)	Labour input (millions of man-hours)	Value-added (millions of current \$)	Value-added per man-hour (\$)
Beverages	126.8	258.8	2,377.5	9.19
Bakery products	182.6	375.9	1,929.2	5.13
Tobacco products	87.2	165.7	987.1	5.96
Rubber products	218.9	432.4	2,021.4	4.68
Leather products	338.4	629.5	1,711.1	2.72
Textile products	882.2	1,758.7	5,006.7	2.85
Clothing	1,337.3	2,425.8	6,527.9	2.69
Furniture	309.9	629.5	2,046.8	3.25
Printing, publishing, etc. . . .	474.0	924.4	5,916.4	6.40
Agricultural implements (ex. tractors)	62.7	123.8	581.8	4.70
Industrial machinery	931.0	1,990.3	9,788.0	4.92
Primary iron and steel	530.3	1,071.6	5,548.1	5.18
Motor vehicles and parts . . .	683.8	1,385.9	6,938.1	5.01
Railway rolling stock	60.2	119.1	552.0	4.63
Shipbuilding	120.7	241.6	802.8	3.32
Aircraft and parts	600.8	1,277.0	5,764.3	4.51
Electrical apparatus and supplies	967.4	1,936.8	8,957.4	4.62
Petroleum and coal products	175.8	350.6	2,795.4	7.97
Secondary chemicals	342.7	702.1	6,553.8	9.33
Residue	3,468.3	7,063.4	30,345.4	4.30
Total secondary manufacturing	11,963.9	23,988.2	107,829.0	4.50

SOURCE: United States Census of Manufactures, 1953.

Table 49

COMPARATIVE PRICES OF SELECTED SECONDARY
MANUFACTURED PRODUCTS, CANADA AND UNITED STATES*Part A*

	Canada/United States ex tax
	%
Bread, white.....	71
Soda crackers.....	110
Whiskey.....	108
Tobacco products.....	114
Rubber and leather footwear.....	108
Men's and Boys' wear.....	112
Boys' wear.....	110
Women's wear.....	108
Girls' wear.....	111
Infants' wear.....	113
Yardgoods and knitting yarn.....	114
Home furnishings.....	119
Furniture.....	105
Other household furnishings.....	108
Notions.....	110
Jewellery.....	130
Silverware.....	100
Electric appliances.....	117
Gasoline — regular — gal.....	106
“ — premium — gal.....	100
Soaps and cleaners.....	108
Personal care.....	114

Source: *Canadian Commercial Policy*, Appendix A.*Part B*

	Canada/United States ex tax
	%
Watt-hour meters.....	127
Industrial control equipment.....	108
Television sets.....	110-15
Electronic components.....	110-15
Low-cost automobiles.....	110-15
Automobile parts.....	110-20
Agricultural implements.....	100 approx.
Primary iron and steel.....	100-108
Diesel locomotives.....	112-15
Railway freight cars.....	105-15
Rubber products.....	115-20
Tires.....	100-15
Cotton textiles.....	115-20

SOURCE: Industry studies, briefs, and testimony. Data are based on estimated averages and can be considered only as rough approximations.

Table 50

GROSS DOMESTIC PRODUCT PER MAN-HOUR OF WAGE-EARNERS IN SELECTED CANADIAN SECONDARY INDUSTRIES, 1945-55

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Beverages.....	3.63	3.99	3.61	3.74	3.76	4.01	4.78	4.78	5.09	5.20	n.a.
Bakery products.....	1.43	1.51	1.23	1.18	1.10	1.13	1.20	1.15	1.13	1.15	"
Tobacco products.....	1.70	1.67	1.73	1.83	1.79	1.94	1.93	2.38	2.58	2.67	"
Rubber products.....	1.23	1.25	1.61	1.78	1.85	2.07	2.11	2.17	2.22	2.33	"
Leather products.....	1.52	1.55	1.47	1.40	1.37	1.41	1.39	1.45	1.50	1.58	"
Textile products (except clothing).....	1.48	1.52	1.49	1.54	1.59	1.77	1.76	1.81	1.82	1.83	"
Clothing (textiles and fur).....	1.47	1.48	1.38	1.41	1.40	1.39	1.37	1.36	1.44	1.41	"
Furniture.....	1.46	1.49	1.47	1.47	1.44	1.48	1.53	1.47	1.50	1.49	"
Printing, publishing, etc.....	2.11	2.10	2.24	2.32	2.31	2.39	2.35	2.38	2.48	2.53	"
Agricultural implements.....	1.44	1.43	1.44	1.72	2.23	1.84	2.00	2.06	2.07	1.94	"
Primary iron and steel.....	1.89	1.81	2.09	2.07	2.10	2.27	2.29	2.20	2.34	2.31	"
Motor vehicles and parts.....	3.21	2.54	3.03	3.34	3.17	3.81	3.97	4.15	4.32	4.20	"
Other transportation equipment.....	2.56	1.95	1.70	1.59	1.67	1.34	1.61	1.80	2.08	2.24	"
Secondary non-ferrous metal products.....	2.03	1.53	1.91	1.93	1.99	2.13	2.20	2.12	2.04	2.23	"
Electrical apparatus and supplies.....	2.19	2.20	2.33	2.42	2.38	2.44	2.38	2.41	2.69	2.93	"
Products of petroleum and coal.....	2.87	2.92	2.94	3.03	3.34	3.82	4.32	4.27	4.60	4.78	"
Secondary chemicals.....	2.01	3.16	2.88	3.20	3.28	3.49	3.45	3.48	3.80	3.68	"
Residue.....	1.75	1.82	1.84	1.91	1.94	2.01	2.02	2.03	2.09	2.12	"
Total secondary manufacturing.....	1.95	1.87	1.89	1.94	1.97	2.07	2.13	2.15	2.27	2.31	"
Secondary manufacturing total using Labour Force figures (including salaried workers).....	1.50	1.35	1.40	1.46	1.43	1.48	1.58	1.64	1.72	1.73	1.77

Source: Data for G.D.P. derived from Table 16, on hours of work from Table 51 and on production workers from Table 52.

Labour input based on 52.14 weeks a year.

Table 51

AVERAGE HOURS WORKED PER WEEK BY WAGE-EARNERS IN SELECTED CANADIAN
SECONDARY MANUFACTURING INDUSTRIES, 1945-54

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
Beverages.....	43.6	43.1	42.4	42.5	42.0	42.3	42.2	41.8	41.6	39.9
Bakery products.....	44.5	43.1	42.2	43.0	43.9	44.4	44.4	44.6	44.0	43.4
Tobacco products.....	42.1	40.6	40.4	40.5	42.5	41.6	40.9	40.3	39.9	39.9
Rubber products.....	44.0	41.8	42.6	41.3	40.9	41.5	41.1	40.8	41.0	40.4
Leather products.....	43.1	41.7	40.6	39.1	40.1	39.4	38.8	40.2	40.0	38.7
Textile products.....	45.5	43.9	43.2	42.7	42.7	43.3	41.5	41.0	41.3	41.0
Clothing.....	39.7	38.7	38.5	37.8	38.2	38.3	37.4	38.1	38.1	36.7
Furniture.....	43.6	42.6	42.8	41.6	42.0	42.4	42.4	42.7	43.1	42.4
Printing, publishing, etc.....	41.4	41.1	40.9	40.4	40.6	40.6	40.2	39.6	39.8	40.1
Agricultural implements.....	43.4	41.6	41.8	41.9	41.4	39.5	39.6	39.2	38.8	39.4
Primary iron and steel.....	46.0	44.3	45.0	44.9	44.2	42.7	41.6	41.5	40.6	39.9
Motor vehicles and parts.....	42.9	39.7	41.5	38.8	40.9	42.3	40.9	40.1	40.4	39.3
Other transportation equipment.....	44.8	42.8	42.5	43.9	43.2	42.7	42.6	41.8	42.0	41.1
Secondary non-ferrous metal products.....	43.5	41.2	42.7	42.6	42.0	42.5	42.2	41.8	41.4	40.9
Electrical apparatus and supplies.....	43.2	41.5	40.9	40.4	41.1	41.3	41.0	41.0	41.2	40.2
Petroleum and coal products.....	43.4	40.5	41.4	41.6	41.3	41.5	41.1	41.5	41.6	41.5
Secondary chemicals.....	44.9	43.2	43.3	43.9	43.3	42.8	42.5	41.9	41.8	41.3
Residue.....	45.3	43.1	43.3	42.9	42.7	42.9	42.7	42.2	41.1	40.3
Total secondary manufacturing.....	43.9	42.0	42.0	41.6	41.7	41.8	41.3	41.1	41.1	40.3

SOURCE: *Review of Man-hours and Hourly Earnings, 1945-55.*

Table S2

**PRODUCTION WORKERS IN SELECTED CANADIAN SECONDARY
MANUFACTURING INDUSTRIES, 1945-54**

(thousands)

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
Beverages.....	13.7	14.6	15.8	15.8	16.5	16.0	16.0	16.1	16.6	16.5
Bakery products.....	24.3	25.6	31.1	31.8	32.7	32.0	32.9	33.6	34.7	34.4
Tobacco products.....	10.1	9.4	9.5	9.1	9.2	8.8	8.4	7.9	8.2	8.2
Rubber products.....	19.4	17.6	19.6	18.1	16.1	17.1	17.8	16.3	17.0	15.7
Leather products.....	29.9	32.9	31.6	30.1	30.7	28.9	27.5	27.8	28.8	26.7
Textile products.....	58.6	59.8	66.1	67.6	67.7	68.5	70.6	61.2	61.7	53.0
Clothing.....	86.0	91.4	95.4	100.0	102.1	100.1	99.9	102.0	104.4	96.4
Furniture.....	16.3	19.6	21.3	22.1	22.9	23.1	22.7	22.5	24.7	24.6
Printing, publishing, etc.....	28.3	32.6	35.0	37.1	38.5	39.5	40.4	40.0	40.7	41.6
Agricultural implements.....	11.2	11.5	13.7	16.1	13.9	13.2	14.0	14.8	11.0	8.9
Primary iron and steel.....	27.0	21.6	24.0	26.3	25.9	25.5	29.3	30.7	30.5	24.4
Motor vehicles and parts.....	29.7	31.3	35.3	34.3	37.2	40.5	42.7	43.4	46.3	36.1
Other transportation equipment.....	103.5	55.4	54.9	53.7	52.1	46.9	60.4	78.2	83.0	70.6
Secondary non-ferrous metal products.....	23.2	21.9	21.2	21.6	20.0	19.4	21.2	20.2	18.1	18.1
Electrical apparatus and supplies.....	34.1	33.9	41.6	42.0	42.7	45.5	50.1	49.7	54.8	50.6
Petroleum and coal products.....	9.1	9.6	10.1	10.7	10.7	10.4	10.5	11.3	11.5	11.5
Secondary chemicals.....	40.2	18.3	20.1	19.1	19.1	21.1	21.1	22.1	23.3	23.9
Residue.....	187.5	178.6	187.7	189.7	186.4	189.0	199.3	200.6	206.2	198.0
Total secondary manufacturing.....	752.1	685.6	734.0	745.2	744.4	743.5	784.8	798.4	824.0	759.2

SOURCE: Various issues of *The Manufacturing Industries of Canada*.

Appendix A

DIVISION OF MANUFACTURING CLASSIFICATION
BY SUB-GROUPS

Primary Secondary

		<i>Foods and beverages</i>
X		Canning and processing
X		Dairy products
X		Grain mill products
X		Meat products
	X	Bakery products
	X	Beverages
	X	Other food industries
		<i>Tobacco and tobacco products</i>
	X	Tobacco, cigars and cigarettes
	X	Tobacco processing and packing
		<i>Rubber products</i>
	X	
		<i>Leather products</i>
	X	Footwear, leather
	X	Gloves and mittens, leather
	X	Leather tanning
	X	Other leather industries
		<i>Textile products (except clothing)</i>
	X	Cotton goods
	X	Woollen goods
	X	Synthetic textiles and silk
	X	Other primary textiles
	X	Other textile industries
		<i>Clothing (textile and fur)</i>
	X	Men's, women's and children's clothing
	X	Knitted goods
	X	Miscellaneous clothing
		<i>Wood products</i>
X		Saw and planing mills
	X	Furniture
	X	Other wood industries
		<i>Paper products</i>
X		Pulp and paper
	X	Boxes and bags, paper
	X	Roofing paper
	X	Miscellaneous paper goods
		<i>Printing, publishing and allied industries</i>
	X	Commercial printing
	X	Engraving, stereotyping and allied industries
	X	Printing and publishing
		<i>Iron and steel products</i>
	X	Agricultural implements
	X	Boilers, tanks and platework
	X	Bridge building and structural steel
	X	Castings, iron
	X	Hardware, tools and cutlery
	X	Heating and cooking apparatus
	X	Machinery, household, office and store

Primary Secondary (Continued)

	x	Machinery, industrial
	x	Machine shops
	x	Machine tools
	x	Primary iron and steel
	x	Sheet metal products
	x	Wire and wire goods
	x	Miscellaneous iron and steel products
		<i>Transportation equipment</i>
	x	Aircraft and parts
	x	Bicycles and parts
	x	Boat building
	x	Carriages, wagons and sleighs
	x	Motor vehicles
	x	Motor vehicle parts
	x	Railway rolling stock
	x	Shipbuilding
		<i>Non-ferrous metal products</i>
x		Non-ferrous metal smelting and refining
	x	Aluminum products
	x	Brass and copper products
	x	Jewellery and silverware
	x	White metal alloys
	x	Miscellaneous non-ferrous metal products
		<i>Electrical apparatus and supplies</i>
	x	Batteries
	x	Radios and radio parts
	x	Refrigerators, vacuum cleaners and appliances
	x	Machinery, heavy electrical
	x	Miscellaneous electrical apparatus and supplies
		<i>Non-metallic mineral products</i>
x		Abrasives, artificial
x		Cement, hydraulic
	x	Salt
	x	Stone products
	x	Asbestos products
	x	Clay products from domestic clay
	x	Clay products from imported clay
	x	Concrete products
	x	Glass and glass products
	x	Gypsum products
	x	Lime
	x	Sand-lime brick
	x	Miscellaneous non-metallic mineral products
		<i>Products of petroleum and coal</i>
	x	Coke and gas products
	x	Petroleum products
	x	Miscellaneous products of petroleum coal
		<i>Chemicals and allied products</i>
x		Acids, alkalis and salts
x		Fertilizers
x		Primary plastics
	x	Medicinal and pharmaceutical preparations
	x	Paints, varnishes and lacquers
	x	Soaps, washing compounds and cleaning preparations
	x	Toilet preparations
	x	Vegetable oils
	x	Other chemical industries

Appendix A (concluded)

Primary Secondary (Concluded)

	<i>Miscellaneous industries</i>
x	Brooms, brushes and mops
x	Clocks, watches and watch cases
x	Fountain pens and pencils
x	Musical instruments
x	Plastic products
x	Scientific and professional equipment
x	Sporting goods
x	Toys and games
x	Typewriter supplies
x	Other miscellaneous industries

If the above classification is applied to manufacturing industry statistics for the year 1953, the following totals are obtained:

Total employees (thousands)	Total earnings (\$ million)	Value-added (\$ million)	Gross Value of Production (\$ million)
<i>Primary</i>			
285.2	851.0	2,017.0	5,495.0
21.5%	21.5%	25.2%	30.9%
<i>Secondary</i>			
1,042.3	3,106.0	5,976.0	12,290.0
78.5%	78.5%	74.8%	69.1%

*Appendix B***STUDIES PREPARED FOR THE ROYAL COMMISSION****I *Studies of Canadian Secondary Industries***

- The Canadian Primary Iron and Steel Industry —
by The Bank of Nova Scotia
- The Canadian Automotive Industry —
by The Sun Life Assurance Company of Canada
- The Canadian Agricultural Machinery Industry —
by J. D. Woods & Gordon Limited
- The Canadian Industrial Machinery Industry —
by Urwick, Currie Limited
- The Canadian Electrical Manufacturing Industry —
by Clarence L. Barber
- The Electronics Industry in Canada —
by Canadian Business Service Limited
- The Canadian Primary Textiles Industry —
by National Industrial Conference Board (Canadian Office)

II *Other Studies*

- The Canadian Chemical Industry —
by John Davis
- Output, Labour and Capital in the Canadian Economy —
by Wm. C. Hood and Anthony Scott
- Probable Effects of Increasing Mechanization in Industry —
by The Canadian Congress of Labour, now
The Canadian Labour Congress
- Canada's Imports —
by David W. Slater
- Canadian Commercial Policy —
by J. H. Young
- The Future of Canada's Export Markets —
by R. V. Anderson
- The Canadian Construction Industry —
by The Royal Bank of Canada
- The Service Industries —
by The Bank of Montreal
- Consumption Expenditures in Canada —
by David W. Slater

Appendix B (Continued)

- Skilled and Professional Manpower in Canada, 1945-65 —
by The Economics and Research Branch, Department
of Labour of Canada
- Canada-United States Economic Relations —
by Irving Brecher and S. S. Reisman
- Canadian Energy Prospects —
by John Davis
- Progress and Prospects of Canadian Agriculture —
by W. M. Drummond and W. Mackenzie
- The Commercial Fisheries of Canada —
by The Fisheries Research Board and The Economic
Service of The Department of Fisheries of Canada
- The Outlook for the Canadian Forest Industries —
by John Davis, A. L. Best, P. E. Lachance,
S. L. Pringle, J. M. Smith, D. A. Wilson
- Mining and Mineral Processing in Canada —
by John Davis
- Labour Mobility —
by The Trades and Labor Congress of Canada, now
The Canadian Labour Congress
- Transportation in Canada —
by J-C. Lessard
- Industrial Concentration —
by The Canadian Bank of Commerce
- Housing and Social Capital —
by Yves Dube, J. E. Howes and D. L. McQueen
- Financing of Economic Activity in Canada —
by Wm. C. Hood with the collaboration of
J. V. Poapst and L. M. Read
- Certain Aspects of Taxation Relating to Investment in
Canada by Non-Residents —
by J. Grant Glassco of Clarkson, Gordon & Co.,
Chartered Accountants
- Some Regional Aspects of Canada's Economic Development —
by R. D. Howland
- The Nova Scotia Coal Industry —
by Urwick, Currie Limited
- Canadian Economic Growth and Development from 1939 to 1955 —
by J. M. Smith

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